Determinants of Capital Structure and Speed of Adjustment in Nigerian Non-financial Firms

By

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A thesis submitted in partial fulfilment for the requirements for the degree of Doctor of Philosophy, at the University of Central Lancashire

January 2019

STUDENT DECLARATION

Type of Award **Doctor of Philosophy (PhD)**

School **Lancashire School of Business & Enterprise**

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Type of Award: Doctor of Philosophy

School: Lancashire School of Business and Enterprise (LSBE)

ABSTRACT

The study aims to examine the capital structure determinants and SOA of all listed, non-financial firms in Nigeria. The objectives are; to investigate the relationship between firms' characteristics and the capital structure choice among non-financial firms listed in the Nigerian Stock exchange, to examine whether the financial crisis affected capital structure determinants. The study also examines the speed of leverage adjustment (SOA) of Nigeria non-financial firms and the impact of the financial crisis on the SOA.

The trade-off and pecking order theories are employed as the main theories to explain firms' financing decisions in Nigeria. Other theories used are signaling, agency and market-timing theories due to their contribution to the capital structure debate. This study used three different types of leverage as dependent variables, which are scaled against total assets. The explanatory variables are profitability, asset tangibility, firm size, firm growth, firm age, business risk and liquidity. It also uses dynamic capital models to identify capital structure determinants and SOA. The current study applied the two-step GMM system estimation.

The result shows 63% SOA for listed non-financial firms in Nigeria. SOA is also faster after the financial crisis when compared to the pre-crisis situation. Furthermore, the study shows the impact of the financial crisis on SOA of long-term and short-term leverage.

Firm characteristics are found to be capital structure determinants of non-financial firms in Nigeria. Asset tangibility and firm growth are positively related with both long-term and short-term leverage and highlight the importance of collateral in financing decisions of Nigerian non-financial firms. Profitability shows a negative and significant relationship with short-term leverage but is positively related with long-term leverage. Firm size and age show a negative and significant relationship with

the long-term and short-term leverage. The coefficient signs of most independent variables confirm the dominance of the pecking order theory in Nigerian firms' financing behaviour.

This study contributes to knowledge by providing evidence of a moderate speed of adjustment among Nigerian non-financial firms. It shows also that firm characteristics are determinants of long-term and short-term leverage in Nigeria.

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ACKNOWLEDGMENT

I thank the almighty God for his faithfulness and infinite love, especially for the strength given me to conclude this study. I also wish to extend my gratitude to Dr. Philip Kostov, my director of study, whose supervision style, knowledge, experience, and time helped me through different stages of my PhD study at UCLAN. Dr. Kostov, your encouragement and recommendation helped me to gain teaching experience in finance, which is helpful in gaining deeper understanding of core issues in the area of corporate finance. I would also like to show deep appreciation to Neil Sutcliffe, my second supervisor, for patiently supporting me through insightful comments and great attention to details. Thank you for your encouragement, which made me, choose this PhD path after supervision of my Master's dissertation at UCLAN.

Dr Mitchell Jonathan Larson, my research degree tutor, deserves very special thanks for his guidance, help and encouragement throughout my study. My deepest gratitude goes also to my line manager, Wayne Hawkins, for his immense support, and encouragement, especially for reminding me always of the need to complete my PhD on time and for contributing financially towards my last year's tuition fees. I also wish to say a big thank you to all lecturers in the accounting and finance department of the Lancashire business school for your kindness and support. May God reward each one of you for your kindness. I also appreciate the suggestions of my friend Dr Rami Salem and Muhammad Usman. My special appreciation goes to university staff working in the research office, especially to Margaret Fisher. I am very grateful to my wife, Ifeoma, and our children, Nonye, Chiamaka, Chukwuebuka and Uchechukwu, for your love, emotional support and for being patient with me throughout my study periods. My gratitude is extended to all who I am unable to name but have directly or indirectly contributed to the success of this study. Thank you all for your immense support.

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ABBREVIATION

AR 1	**First Level Autocorrelation**
Astang	Asset tangibility
CFO	Chief Financial Officer
EBITDA	Earnings before Interest Depreciation and Amortization.
GMM	Generalized Moments of Method
Growth	Firm growth
Interest	Lending interest rates
IPO	Initial Public Offering
I.I.D	Independently and Identically Distributed
Listed	Publicly held firms
Liquid	Liquidity
Ltlev	Long-term leverage
NPV	Net Present Value
NSE	Nigerian Stock Exchange
OLS	Ordinary Least Square
Prof	Profitability
RSK	Risk
Stlev	Short-term Leverage
Std Error	Standard Error
Tax	Effective Income Tax
Totlev	Total leverage
VIF	Variance Inflation Factor
WACC	Weighted Average Cost of Capital

Chapter One: Introduction

1.1 Background of the study

In the corporate finance literature, the debate over the determinants of firms' capital structure is still on-going due to the extensiveness and indeterminate nature of firms' debt to equity (Ozkan, 2001, Serrasqueiro and Caetano, 2015, Vo, 2017). This has made it difficult to answer the important question raised by Myers (1984) regarding how firms choose their capital structure. Since the irrelevancy theory of Modigliani and Miller (1958b), various capital structure theories and empirical evidences have investigated the determinants of capital structure when the assumption of Modigliani and Miller (1958b) are relaxed. For instance, it is suggested by the trade-off theory that when tax advantage and other benefits of debt are traded-off against the risk of bankruptcy (Kraus and Litzenberger, 1973), and the agency cost of debt (Jensen and Meckling, 1976), the optimal capital structure will be attained.

Nevertheless, the complexity of this debate and the theoretical inconclusiveness of the trade-off theory was shown by adding several factors into the 'puzzle' (Myers, 1984). These factors include the effect of personal taxation introduced by Miller (1977), the availability of substitutes of debt known as the non-debt tax shield (DeAngelo and Masulis, 1980) and the problem of asymmetric information (Myers, 1984, Baskin, 1989, Bharath et al., 2008, Nishihara and Shibata, 2017, Myers and Majluf, 1984). On the other hand, the optimal capital structure is ignored by the pecking order theory. This argues for a hierarchy of financing whereby a firm will first use funds which are generated internally (retained earnings) before using debt and then equity when all other options are exhausted (Myers and Majluf, 1984, Myers, 1984).

Apart from differences in theoretical assumptions, there is a lack of consensus among previous studies regarding the factors that determine firms' debt to equity choice in developing countries

(Abor and Biekpe, 2009, Črnigoj and Mramor, 2009, Abu Mouamer, 2011, Vo, 2017, Khémiri and Noubbigh, 2018, Zhang et al., 2018). Črnigoj and Mramor (2009) suggest the need for further investigation of capital structure determinants in individual developing countries, arguing that other forces might be at work for firms in developing countries when compared to those in developed countries.

In the case of Nigeria, there have been major changes in the business environment after the financial liberalisation policy of 1987 and financial sector reform in 2005. These reforms intensified the competition between commercial banks and non-financial firms in the capital market, making it difficult for non-financial firms to issue debt finance. The result is the accumulation of liquidity in the banking sector, leading to firms' dependence on costly bank loans in their financing decision. Consequently, the current study examines the capital structure determinants and SOA for firms in Nigeria, in order to understand how the uniqueness of its business and institutional environment, which includes its underdeveloped and illiquid capital market, dependence on bank lending affect firms' capital structure determinants and the SOA.

The present study investigates the determinants of capital structure and SOA over a 15-year period to find out how the changes in the Nigerian capital market affect the capital structure decisions and the SOA of non-financial Nigerian firms. Using this long period ensures consistent and reliable observation, which increases the generalisability of the study result. Furthermore, this longer time-period enables the examination of capital structure determinants and SOA before and after the financial crisis to show the impact of the financial crisis on the debt-to-equity decisions of Nigerian non-financial firms.

1.2 Research Problem and Rationale

In spite of the importance of capital structure for developing countries (Abor, 2008, Bhaduri, 2002, Köksal and Orman, 2014, Lemma and Negash, 2014, Hadi and Suryanto, 2017), firms in emerging economies have not received sufficient attention in the capital structure research until now (Al-Najjar and Taylor, 2008, Črnigoj and Mramor, 2009, Vo, 2017). While this is partly due to the prevalence of political and socio-economic instabilities (Bhaduri, 2002), market inefficiencies and institutional constraints add additional complication to the capital structure debate in the context of developing countries (Samuel, 1996, Agarwal and Mohtadi, 2004, Abor, 2008).

Thus, earlier empirical studies focused extensively on the firm characteristics that affect firms' capital structure among companies in the US (Castanias, 1983, Altman, 1984, Bradley et al., 1984, Titman and Wessels, 1988b). Rajan and Zingales (1995) identified the four most researched firm-level determinants of leverage which are, asset tangibility, profitability, growth opportunity and firm size but limited their study to highly developed (G-7) countries. However, they accept that if the robustness of empirical findings relating to capital structure are not tested outside the context (developed countries) in which they are found, it will be difficult to ascertain if they are merely spurious correlations. Similarly, Myers (2003) advocates the examination of firms' debt-to-equity in developing countries to better understand firms' financing choices, especially in such an environment where agency and information problems are severe.

Some studies in developing countries have investigated firms' capital structure determinants (Booth et al., 2001b, Fan et al., 2012, Nha et al., 2016, Gómez et al., 2016, Ramli et al., 2018, Khémiri and Noubbigh, 2018) and SOA (Lemma and Negash, 2014, Zeitun et al., 2017, Munisi, 2017) without regards to variation in their institutional environment. These studies assume that

factors, which determine firms' choice of finance, will be the same among these developing countries.

However, the result obtained through investigation of capital structure decisions in individual countries shows that the relationship between leverage and firm-level factors may be influenced by firms' macroeconomic environment (Samuel, 1996, Agarwal and Mohtadi, 2004). This variation in the firms' business environment may have contributed to contradictory evidences presented by previous capital structure studies. For instance, with regards to tangibility and leverage, some studies report a negative and significant relationship (Nguyen and Ramachandran, 2006, Ahmed Sheikh and Wang, 2011) while other studies show a positive and significant association (Abor, 2008, Eldomiaty, 2008, Gwatidzo and Ojah, 2014, Ram, 2017, Zhang et al., 2018). Similarly, regarding firm growth, some studies found a negative and significant relationship (Bassey et al., 2014, Abor and Biekpe, 2009). Other studies in some developing economies show that firm growth is financed mainly with debt (Delcoure, 2007, Nguyen et al., 2014, Aggarwal and Padhan, 2017, Khan and Akhtar, 2018). Consequently, studies have suggested examination of the capital structure of individual countries (Samuel, 1996, Agarwal and Mohtadi, 2004, Vo, 2017), which justifies the need to re-examine capital structure determinants and SOA of Nigerian firms.

Furthermore, regarding SOA, prior literature shows the relevance of firm characteristics (Ozkan, 2001, Byoun, 2008, Clark et al., 2008, Soekarno et al., 2015, Zhou et al., 2016b, Nunes and Serrasqueiro, 2017). However, studies show variation of SOA between developed and developing countries. For instance, Dang et al. (2012), Antoniou et al. (2008) and Flannery and Rangan (2006), found 30%, 32% and 34% speeds of adjustment respectively for US firms. Similarly, Antoniou et al. (2008), show 32% SOA for UK firms and 39% for French firms. On the other hand, firms in developing countries show higher speeds of adjustment. Ramjee and Gwatidzo (2012) reported 65.5% SOA for South African non-financial firms, while Ngugi (2008) shows SOA of 70.1 % for

non-financial firms in Kenya. This is higher than the SOA of 50% reported by Bhaduri (2002) for Indian-listed companies. This variation may be due to differences in the institutional environment (Öztekin and Flannery, 2012), varying access to the public debt market (Aybar-Arias et al., 2012) or higher transaction costs (Dufour et al., 2018). The variation of adjustment speed, even among developing countries, makes the examination of adjustment behaviour of Nigerian non-financial firms interesting, to find out how their unique business environment affects their SOA.

Even within a particular country, studies have shown that economic conditions affect firms' characteristics and adjustment behaviour (Lööf, 2004, Harrison and Widjaja, 2014, Iqbal and Kume, 2015, Zeitun et al., 2017). Cook and Tang (2010) report that firms' adjustment is faster during favourable economic conditions. Studies also show that firms' borrowing capacity may be affected by diminished lending and increased lending costs during a crisis situation (Harrison and Widjaja, 2014, Zeitun et al., 2017). Thus, this study examines how the 2008 financial crisis affect capital structure determinants and SOA using data from listed non-financial firms in Nigeria.

The study focuses on Nigeria due to the uniqueness of its macro-economic environment, especially due to additional complications caused by institutional constraints and inefficiencies of the market. On the Nigerian Stock Exchange, government bonds such as the federal government bonds, state and local government bonds and the so-called supranational bonds issued by the African development bank trade alongside those of non-financial firms. Furthermore, the federal government's forced capitalisation policy increased the competition between financial firms (mainly commercial banks) and non-financial firms. These challenges limit the debt issuance capacity of Nigerian non-financial firms and lead to over-reliance on costly bank lending.

Thus, owing to the uniqueness of the Nigerian business environment, especially the increasing role of bank lending, it is important to re-examine the determinants of firms' capital structure and SOA in Nigeria over a long period (15years) to ensure a reliable and consistent observation.

Furthermore, examining the determinants of capital structure and SOA before and after the financial crisis will show the impact of the economic state on the firms' characteristics and the adjustment behaviour of firms.

There are also other reasons why the investigation of capital structure determinants in Nigeria is worthwhile. In the past few years, many Western and Asian (mainly Chinese) companies have been investing heavily in Nigeria. Therefore, investigating the capital structure determinants and SOA of firms in Nigeria, as a developing country, will make a specific contribution to capital structure research.

1.3 Research Aims and Objectives

The study aims to examine the capital structure determinants and SOA of all listed, non-financial firms in Nigeria. The objectives are; to investigate the relationship between firms' characteristics and the capital structure choice among non-financial firms listed in the Nigerian Stock exchange and to examine whether the financial crisis affected capital structure determinants. The study also examines the speed of leverage adjustment (SOA) of Nigeria non-financial firms and the impact of financial crisis on the SOA.

1.4 Significance of the Study

The present study will add to the dynamic capital structure literature by examining target capital structure determinants and how Nigerian non-financial firms adjust their leverage towards target. Previous capital structure studies in Nigeria used a static model and non-representative sample size (Salawu and Ile-Ife, 2007, Akinlo, 2011, Akinyomi and Olagunju, 2013, Adesola, 2009). Ahmad and Etudaiye-Muhtar (2017) employed a dynamic capital structure model. However, their study used a limited sample size (only 59 non-financial firms), a different time-period and included country-level variables.

Unlike prior capital structure studies in Nigeria, the current study employed a broader sample size (127 non- financial firms) over a 15-year period, which no previous work on capital structure determinants in Nigeria has covered. Investigating capital structure determinants and SOA using this long period will ensure both the reliability and the relevance of the study results and, thus, their generalisability. This longer period was also relevant since one of the objectives of this study is to observe the capital structure determinants and SOA in two different periods, before the financial crisis (from 2001-2007) and after the financial crisis (from 2010-2015).

Another issue is on the measurement of leverage and types of leverage used. Several empirical studies have defined leverage based on book value (Shah et al., 2004, Anwar, 2013, Alzomaia, 2014, Bassey et al., 2014) debt market value (Faulkender and Petersen, 2006, Fan et al., 2012, Qiu and La, 2010) or both (Bevan and Danbolt, 2002, Belkhir et al., 2016). Other studies which have employed book leverage have either used total debt or total liabilities, or employed either long-term or short-term debt. Few studies have used all three types of leverage as proxy for capital structure (Abor, 2008, Psillaki and Daskalakis, 2009, Köksal and Orman, 2014). This lack of consistency in the measurement of leverage and the type of leverage has reduced the generalisability of previous research findings (Ahmed Sheikh and Wang, 2011). Consequently, the current study employed short-term, long-term and total leverage which are scaled against their book value. This is because each type of debt shows considerable differentiation in terms of maturity, terms and contingencies of pay out, interest rate concession and the priority in the face of bankruptcy (Berglöf and Von Thadden, 1994, Michaelas et al., 1999, Bevan and Danbolt, 2002, Bhaduri, 2002).

1.5 Overview of the Methodology

The current study used the sample size of 127 listed non-financial firms for the period 2001 till 2015, resulting in 1905 firm year observations. The rationale for using a longer period is to ensure the reliability and the relevance of the study result and, thus, its generalisability. To achieve the study's objectives, the published annual reports of these Nigerian firms were used as the source of secondary data. These annual reports are from the Osiris database, which contains the annual reports of listed companies around the globe.

This study uses three different measures of leverage (total leverage, long-term leverage and short-term leverage) as dependent variables. In line with prior studies, these dependent variables were measured against the total book value of assets (Pirtea et al., 2014, Banerjee and De, 2014, Kakilli Acaravci, 2015). In this study, 7 firm characteristics were used as independent variables to offer a broader framework for the investigation of firms' capital structure in Nigeria. These determinants are firm size (SIZE), profitability (PROF), asset tangibility (ASTANG), firm growth (GWT), age (AGE), risk (RISK) and lagged leverage (L1).

In the estimation of study result, this study uses the dynamic capital model to identify capital structure determinants and SOA among Nigerian non-financial firms. Prior studies in Nigeria have used different econometric techniques, specifically the ordinary least square (OLS), fixed or random effects (Ebel Ezeoha, 2008, Salawu and Agboola, 2008, Adesola, 2009, Onaolapo and Kajola, 2010). While the OLS technique overstates the correlation coefficient (Antoniou et al., 2008), the random effects model is mostly inconsistent since it ignores variables that control for unobserved heterogeneity (Aybar-Arias et al., 2012).

Unlike prior studies, this study considers OLS, fixed and random effects to be inappropriate as they are not helpful in capturing firms' adjustment behaviour and ignore the dynamic nature of capital structure. Following prior studies (Clark et al., 2008, Lemmon et al., 2008, Abdeljawad et al., 2017),

the current study employed GMM system estimation which uses two simultaneous equations both in the level and in the first differences. This is because, in instrumenting the first differences' equation and the level equation, the GMM system employs the lagged levels of endogenous variables and the difference variables respectively (Aybar-Arias et al., 2012). Due to its use of more moment conditions, the GMM system's finite sample bias is reduced and its efficiency improved, even in the presence of weak instruments. The current study also employed the two-step GMM system in its dynamic capital structure estimation to eliminate the potential endogeneity problem. This means that the two-step GMM ensures the robustness of study results.

1.6 Overview of the Research Contribution

This study makes a contribution to previous literature in several ways. Firstly, unlike previous capital studies in Nigeria that used a non-representative sample size and limited time-period (Salawu and Ile-Ife, 2007, Akinlo, 2011, Akinyomi and Olagunju, 2013, Adesola, 2009, Bassey et al., 2014, Ahmad and Etudaiye-Muhtar, 2017), the current study examined the capital structure determinants of listed non-financial firms over a 15-year period (1905 observations). The result shows evidence of leverage adjustment among Nigerian non-financial firms, which helps in dispelling the apparent consensus of leverage stability and stationarity propagated by researches based on static trade-off models. Ahmad and Etudaiye-Muhtar (2017) also used the dynamic model (GMM) in their estimation. However, their study included country-level variables and covered a very limited time period.

Secondly, using a dynamic model, this study found that firm characteristics are the determinants of SOA among Nigerian non-financial firms. The SOA (based on total leverage) of Nigerian firms is 63%, indicating that Nigerian firms show moderate adjustment speed. This moderate speed of

adjustment, which is above the average result documented by studies in developed economies, may be due to the dominance of bank lending in Nigeria since the 2005 financial market reform.

Thirdly, this study makes a significant contribution by investigating capital structure determinants and SOA of Nigerian non-financial firms before and after the financial crisis, which no prior study in Nigeria has done. The findings show that the speed of long-term and short-term leverage adjustment is faster after the financial crisis and, thus, unable to support the empirical results of Ariff et al. (2008) and Zeitun et al. (2017), who found that firms' adjustment to target leverage is slow after a financial crisis.

Finally, the current study found that the most important determinants of short-term and long-term leverage among Nigerian non-financial firms is asset tangibility. Its positive and significant relationship with the study's dependent variables remains unchanged both in the full sample and sub-samples. This means that Nigerian firms need tangible assets to obtain long-term debt and short-term bank loans. The demand for tangible assets, even for short-term financing, may be because public debt is not easily obtainable, leading to reliance of non-financial firms on loans offered by commercial banks. Furthermore, bankruptcy laws are weak and not properly enforced in Nigeria, resulting in the increase in lending costs and the demand for collateral for all types of debt.

1.7 Nigerian Financial Market

Previous literature has emphasised the complementary role of a well-functioning market and strong banking sectors in the reduction of asymmetric information and transaction costs for firms (Greenwood and Jovanovic, 1990, Song and Thakor, 2010, Singh, 2011). The Nigerian financial market is illiquid and underdeveloped. It also experiences the dominance of commercial banks which, according to Singh (2011), will result in the accumulation of liquidity in the banking sector.

This dominance of banks is intensified by the 2005 reform of the financial sector to increase the volume of banks' assets, encourage instruments' diversity and ensure a healthy and competitive financial system that supports real sector financing (Soludo, 2006). These financial sector reforms outlined by the central bank of Nigeria in 2003, as part of a national economic empowerment and development strategy (NEEDS), mandated banks to drastically increase their capital requirement to N25 billion from the initial requirement of N2 billion and to ensure consolidation of their operation through mergers and acquisitions (Hesse, 2007). This caused many commercial banks to compete with non-financial firms in the capital market to successfully increase their capital requirement, leaving non-financial firms with little chance of securing external finance. This further increased the reliance on commercial banks as the major suppliers of external finance.

Furthermore, listed non-financial firms are having difficulty in obtaining debt finance due to the large amount of government bonds (Federal government, state and local government) and the so-called supranational bonds issued by supranational organisations, such as the African development bank, that are traded through the NSE.

Table 1.1: Government Bonds vs Corporate Bonds in the 1st Quarter of 2015

Category	Market Capitalisation (NGN) As of Mar 31, 2015	Market Capitalisation (USD) As of Mar 31, 2015
FGN Bonds	4,780,112,923,285	24,001,370,372
State and Municipal Bonds	540,993,942,400	2,716,378,502
Supranational Bonds	12,000,000,000	60,253,063
Corporate Bonds	188,391,500,000	945,930,408

(Source: NSE Fact sheet, 2015)

The table shows that, in the first quarter of 2012, the federal government bond, the state bond, the municipal bond and the supranational bond dominate the capital market. This may make it difficult for non-financial firms to borrow effectively from the capital market.

1.8 Structure of the Thesis

In the first chapter, the current study introduces the research background, problems and rationale of the study (in sections 1.1 and 1.2). The study aim and objectives (section 1.3), the significance of the study, the summary of the methodology and the overview of the research contributions (in sections 1.4, 1.5 and 1.6) are also discussed in this chapter. The study gives a brief overview of the Nigerian financial market in section 1.7.

The second chapter reviews the framework theories (in sections 2.2 -2.4) covering the irrelevancy theory of Modigliani and Miller (1958a), Modigliani and Miller (1963a) in which tax advantage of debt was recognised . It also discussed the trade-off and the pecking order theories, which are the background theories of this study. To ensure a deeper understanding of firms' trade-off behaviour, the static trade-off theory, the dynamic trade-off theory and empirical studies on trade-off theory are discussed briefly in sections 2.3.1 and 2.3.2 respectively.

Similarly, to gain an understanding of firms' pecking order behaviour, theories of both traditional, modified pecking order theories and empirical evidences on pecking order theories are reviewed in section 2.4. In addition, other capital structure theories such as the agency theory, the market-timing theory and signalling theories are included (see sections 2.5 to 2.7), owing to their contribution to the capital structure debate and in evaluation of both trade-off and pecking order theories. This chapter ends with a brief summary (section 2.9)

In the third chapter, the current study reviews empirical literature and develops hypotheses. It starts with the review of empirical studies relating to the firm-level determinants of capital structure

(profitability, asset tangibility, firm size, firm growth, age, business risk and liquidity) in section 3.2. Empirical studies on firms' adjustment behaviour are discussed in section 3.3 based on the degree of indebtedness and on the firm size. The industry determinants of capital structure and the SOA pre-and post-financial crisis are discussed in section 3.5. Literature on the impact of the financial crisis on SOA is also reveiwed in section 3.6. The last section (3.7) is the summary of the whole chapter.

Chapter 4 focuses on the study's methodology and starts with the ontological and epistemological framework that influences the study's methodology and methods. It describes the sample size, the data collection and measurement of variables in section 4.2, followed by the measurement method for both dependent and independent variables (section 4.3). The justification for the choice of measurement is provided in section 4.4. Furthermore, the empirical procedures of data analysis are discussed in section 4.5 and cover preliminary analysis and multivariate analysis. In multivariate analysis, various econometric techniques (OLS, fixed effect and random effect) are discussed with the aim of justifying why the GMM system was considered the most appropriate for the purpose of this study. In section 4.6, further analysis and a robustness check are also conducted. This is followed by a brief summary of the entire chapter in section 4.7.

Chapter 5 focuses on analysis of determinants of capital structure. It discusses descriptive statistics and multicollinearity issues in sections 5.2 and 5.3 followed by multivariate analysis in section 5.4. Further analysis and a robustness check, based on the firm size and degree of indebtedness and industry, are conducted (section 5.5), before a brief summary of the entire chapter.

Chapter 6 discusses the study findings regarding the speed of adjustment. It discusses the SOA of Nigerian non-financial firms and factors influencing the adjustment behaviour in sections 6.2 and 6.3. The impact of the financial crisis on the SOA of long-term and short-term leverage is discussed in section 6.4, followed by a brief summary of the entire chapter.

Chapter 7 summarises and concludes the entire study. It also discusses the study's implications and limitations in sections 7.5 and 7.6. In the last section, the suggestion for future research is also provided.

Chapter Two: Theoretical Frameworks

2.1 Introduction

In this chapter, the current study reviews both theoretical and empirical studies relating to capital structure determinants, SOA and their differences before and after the financial crisis. The chapter is organised as follows: Section 2.2 starts with Modigliani and Miller (1958a) and Modigliani and Miller (1963a). Sections 2.3 and 2.4 review literature on the trade-off and the pecking order theories. To ensure a deeper understanding of firms' trade-off behaviour, the current study reviews static and dynamic trade-off literature.

2.1.1 Understanding Capital Structure

A firm's capital structure shows the proportion of its debt to equity and is very important; the way debt and equity are combined will influence the weighted average cost of capital (WACC) and firms' survival ability in a competitive environment (Mingfang, 2000, Chowdhury and Chowdhury, 2010). The majority of prior studies used leverage as a capital structure proxy (Drobetz and Fix, 2003a, Delcoure, 2007, Abor, 2008, Anderloni and Tanda, 2014, Handoo and Sharma, 2014). In finance, the term leverage is used to explain a firm's debt usage and shows the level of a firm's debt over its total assets. There are several benefits of leverage. Agarwal and Mohtadi (2004) and Harrison and Widjaja (2014) argue that it is quicker to raise debt finance than equity and emphasised that lenders are not interested in the operating activities of the business, which they finance. Furthermore, when a firm uses debt, the firms' after-tax earnings could be increased due to benefits of tax shields (DeAngelo and Masulis, 1980, Anwar, 2013). Debt is a mechanism of control in the agency theory of free cash flow (Jensen, 1986) and, most importantly, ensures shareholder's control of the firm. This issue of control is the major reason why debt issuance is welcomed by most firms' current shareholders.

However, debt has some agency related costs which include the risk of underinvestment due to conflict of interests (Myers, 1977) and the danger of losing a debt tax shield given other substitutes of debt such as the non-debt tax shield (DeAngelo and Masulis, 1980, Masulis, 1983). In addition, through leverage, firms have been encouraged to take excessive risks which have led to the reduction of profitability (Toy et al., 1974, Cosh and Hughes, 1994).

Previous studies on firms' financing behaviour have suggested several theories which, in one way or the other , attempt to explain the debt ration variation among firms. These theories include Modigliani and Miller's theorem, the trade-off theory, the pecking order theory, the agency theory and the signaling and the market timing theories, suggesting that not one single theory can explain the capital structure decision of firms (Abdeljawad et al., 2017). Although each capital structure theory is fundamentally different, some have certain assumptions, which they share with each other to a varying degree.

In this chapter, the current study begins with Modigliani and Miller (1958a) irrelevancy theorem which gives theoretical underpinnings to capital structure theories (Brusov et al., 2011) and then reviews the empirical studies related to the trade-off theory and the pecking order theory. Other capital structure theories are also discussed due to their contribution to the understanding of both the pecking order and the trade-off theories. The section will then conclude with a brief summary of the most relevant issues discussed in the whole chapter.

2.2. The Modigliani-Miller Theorem

The Modigliani and Miller (1958b) theory has gained prominence in the field of corporate finance due to its idea of the irrelevancy of capital structure (Ahmeti and Prenaj, 2015, Ardalan, 2017, Chen, 2017). They argued that, in a frictionless world, no difference exists between debt and equity (Al-Najjar and Taylor, 2008). This initial theory of Modigliani and Miller (1958a) which is widely known as 'irrelevancy theory' outlined some restrictive assumptions which include the absence of bankruptcy costs, transaction costs, personal taxes, asymmetric information and competitive markets (Pagano, 2005).

The authors argue that a firm's value will not depend on its capital structure under perfect market conditions. This implies that the weighted average cost of capital will remain the same even after changing a firm's debt to equity mix, suggesting that there is no need for managers to focus on debt or equity proportion(Ahmed Sheikh and Wang, 2011). Modigliani and Miller (1963b) reconsidered their irrelevancy proposition and incorporated the benefit of a tax shield. With this theory, Modigliani and Miller (1963a) suggest that firms will use more debt and less equity in their capital structure. This shift of emphasis on debt is as a result of the benefit of a tax shield and its impact in reducing the weighted cost of capital.

The limitations of this theory of Modigliani and Miller (1963b) are shown through the work of Miller (1977) on personal taxation. The author argued that tax shield benefits are exaggerated, since these will be offset by personal tax. In spite of this recognition that debt usage will maximise a firm's value, the theory ignores the risk of the marginal cost of debt (Brusov et al., 2011), especially the bankruptcy cost associated with leverage (Gruber and Warner, 1977, Al-Najjar and Hussainey, 2011) which makes their theory unrealistic and valueless in the real world (Al-Najjar, 2011).

The merit of Modigliani and Miller's (1958, 1963) theorem is that it has given theoretical underpinning to other capital structure theories and is also seen as the first theory of capital structure

(Pagano, 2005). In the academic domain of finance, their contributions are well acknowledged as the cornerstone of contemporary scientific research (Ardalan, 2017).

2.3 The trade-off theory

The trade-off theory is an attempt to relax the 'no tax and bankruptcy cost' assumptions of Modigliani and Miller (1958b). Their recognition of the tax advantage of debt, after reassessing the irrelevancy theory in their work published in 1963, suggests that debt increases the value of the firm. The major argument of Modigliani and Miller (1963a) is that interest paid on debt financing could be deducted from taxable earnings which increases firms' profit. However, the authors' inability to place limitations on the firms' debt capacity, suggests that a firm's value will be maximised when its level of debt is 100%.

Although there are evidences of the tax advantage of debt (Brick and Palmon, 1992, Graham, 2000, Kemsley and Nissim, 2002, Korteweg, 2010), this tax effect is minimal (Graham, 2000) and may even be reduced by other potential costs (Miller, 1977, DeAngelo and Masulis, 1980, Myers, 1977, Kim, 1982). For instance, Miller (1977) argued for the impact of personal taxes on the benefit of tax shield and Myers (1977) raised the agency problem of 'underinvestment' arguing that owners will ignore a project with a positive net present value if they notice that it will be more beneficial to firms' debt holders.

Furthermore, factors included are the impact of a non-debt tax shield raised by DeAngelo and Masulis (1980), agency cost arguments (Jensen and Meckling, 1976, Barnea et al., 1980, Jensen, 1986, Morellec, 2004) and financial distress cost (Opler and Titman, 1993, Pindado and Rodrigues, 2005, Almeida and Philippon, 2007). These factors enable a better explanation of the assumed trade-off.

It is important to observe a significant shift from 'the tax shield vs bankruptcy' argument seen in Kraus and Litzenberger (1973) into a wider consideration of potential cost and benefits including

agency theoretical considerations which, according to Zeitun et al. (2017), are embedded in the trade-off theoretical assumptions. For instance, Morellec (2004) recognised the agency problem while Fama and French (2005) included agency cost between bondholders and stockholders and the benefits of free cash flow in their explanation of the trade- off theory. Unlike the irrelevancy theory, where no limit is placed on debt, the trade-off theory attempts to balance costs and benefits associated with firms' debt usage. Consequently, the theory suggests that firms will use debt until the marginal costs of debt completely offset its marginal benefits. The theory suggests that the ideal debt-to-equity ratio will involve identification of a trade-off point, which may be unique for each firm.

The implication of this theory for firms is that firms will show preference for debt until a certain point, where the danger of financial distress increases. The theory suggests that profitability, asset tangibility and firm size will be positively related to leverage while business risk and firm growth will show a negative relationship with leverage. Graham (2000) documents findings which show that large, liquid, profitable firms use less debt. Another drawback of this theory is its excessive focus on the debt tax shield (Hennessy and Whited, 2005), neglecting other forms of tax shield.

2.3.1 Static Trade-off Theory

The earlier works on the trade- off theory recognised the tax advantage of debt, but also placed an emphasis on the bankruptcy risk, which is likely given a certain level of debt (Kraus and Litzenberger, 1973, Leland, 1994, Leland and Toft, 1996). This version is called static trade-off since it considers only one single period and maintains that the reduction of tax payment is the major aim of using debt. According to the static trade-off theory, debt issuance raises the value of a firm through smaximisation of its tax shield benefits. It also assumes that firms achieve their target debt ratio over time (Frank and Goyal, 2007). One central theme in the static trade-off theory is the idea of optimal leverage.

Owing to its idea of balancing cost and benefit of leverage, the static trade-off theory presupposes a 'trade-off' tax advantage against financial distress cost and other potential costs resulting from the debt finance option (Harris and Raviv, 1991, Graham and Harvey, 2001). Within this theory, it is assumed that both cost and benefits of leverage will offset each other once there is optimal leverage. This suggests that a firm which is below its optimal leverage will not improve its performance until it moves towards the optimal leverage. The trade-off theory assumes that any firm that has a financing need, but is, however, below its target debt ratio, is likely to borrow more and will also adjust its debt level downwards when exceeding its target (Cotei and Farhat, 2009).

2.3.2 Dynamic Trade-off theory

Another strand of research is the dynamic trade-off model, which recognises adjustment costs ignored in the static trade-off theory (Hennessy and Whited, 2005, Almeida and Philippon, 2007, Abdeljawad et al., 2017). Prior literature on dynamic capital structure research overwhelmingly suggests the idea of long-run target leverage and argues that firms make gradual adjustment towards this target (Gaud et al., 2005, Hennessy and Whited, 2005, Haron, 2014, Yang et al., 2015).

Dynamic capital models allow firms' deviation from the target level of leverage and attempt to balance the advantage of achieving their leverage target with the adjustment cost towards that target (Huang and Ritter, 2009, Öztekin, 2015, Abdeljawad et al., 2017, Zeitun et al., 2017). It also focuses on measuring the speed of adjustment (SOA) or the extent of rebalancing the debt ratio of a firm in the direction of a chosen target. The static model ignores this adjustment behaviour. In the dynamic capital structure model, the firms' debt-to-equity choice is linked to its margin of financing which it expects in the coming period (Frank and Goyal, 2007, Castro et al., 2014, Getzmann et al., 2014, Soekarno et al., 2015, Devos et al., 2017, Maroney et al., 2018). With its assumption of a going concern, the dynamic capital structure model gives more attention to the actual firms' leverage

behaviour (Drobetz and Wanzenried, 2006, Gwatidzo and Ojah, 2014, Maina et al., 2018) unlike in the static trade-off model which only emphasises the tax advantage of debt. In the dynamic trade-off theory, firms only adjust if the cost of being far from their target leverage is greater than the actual adjustment cost(Gaud et al., 2005, Hennessy and Whited, 2005, Haron, 2014, Yang et al., 2015) meaning that the actual leverage is driven by the net adjustment costs (Leary and Roberts, 2005).

Strebulaev (2007) found that firms deviate from optimal leverage in their dynamic capital structure model. Zhou et al. (2016b) emphasised the transitory nature of such deviation. The idea is that a firm that is below its optimal leverage will not improve its performance until it moves towards the target leverage. Owing to the cost of adjustment towards the optimum leverage, some studies have considered the possibility of partial adjustment (Leary and Roberts, 2005, Drobetz and Wanzenried, 2006).

2.3.3 Empirical Studies on Trade-off Theory

The trade-off theory has enjoyed the support of many empirical studies on firms' choices of financing. Miglo (2010) compared the trade-off theory and pecking order theory and found that many capital structure determinants (apart from profitability) are better explained by the trade-off theory. Graham and Harvey (2001) investigated the existence of optimal leverage among US firms and found that the majority of chief financial officers (CFOs) maintain a target leverage ratio. Furthermore, Bancel and Mittoo (2004) document evidence that most companies in the UK, Netherlands and Germany set target debt ratios. Belkhir et al. (2016) , using a sample of 444 listed firms covering the period 2003-2011, found that firms in MENA countries use target leverage ratios and adjust these target ratios over time.

Despite the practicability of the trade-off theory, many empirical studies have identified various problems with its conclusions and argue that the trade-off theory is unable to offer an explanation

as to the actual behaviour of firms (Hovakimian et al., 2011, Robb and Robinson, 2012, Mac an Bhaird and Lucey, 2010). For instance, Hovakimian et al. (2011) observed that highly profitable firms use less debt relative to less profitable firms since they have less need of external finance. This means that their profitability will lead to more equity issuance instead of debt. This is contrary to the proposition of the trade-off theory, which suggests that more debt will lead to increased profitability. Also, Graham (2000) found evidence of debt conservatism among profitable large and liquid firms. Similarly, Robb and Robinson (2012) document evidence which shows that companies in their early years of operation use more debt.

Myers (1993) argues that this strong negative association between profitability and leverage is the most obvious evidence against the trade-off theory. It is important to point out that these studies were carried out among developed countries, which makes it necessary to investigate the validity of the trade-off theory in explaining firms' financing behaviour in Nigeria as a developing country. Furthermore, these limitations of trade-off theory suggest that firms' capital structure decisions are not completely reconcilable with one single theory (Abdeljawad et al., 2017), which also explains why the current study will review various capital structure theories. Additionally, the trade-off theory is also unspecific about the type of debt with which the benefit of tax shield is maximised. Thus, this work used three types of debt to understand how each one influences the firm-level factor among Nigerian firms since there is a need to be specific on the type of debt implied. However, in spite of these limitations, the relevance of the trade-off theory is its practical relevance (Ahmed Sheikh and Wang, 2011).

2.4 The Pecking Order Theory

Firms' hierarchy of financing was proposed by Donaldson (1961), who argued that firms will prefer retained earnings to externally generated funds and then prefer debt finance before equity. Nevertheless, the trade-off theory could not explain the observed low debt ratios in many profitable firms, despite the tax advantage of debt. Therefore, the pecking order theory, which is based on information asymmetry and its impact on firms' cost of financing, offers an alternative explanation of firms' financing behaviour (Myers, 1984, Myers and Majluf, 1984).

Unlike the trade-off theory, the pecking order theory does not recognise the idea of target debt ratio (Frank and Goyal, 2003). Myers and Majluf (1984) and (Myers, 1984)argued that managers are more knowledgeable about what promotes the value of the firm than less informed external investors. To avoid the risk of underinvestment, managers will fund their new investments using a pecking order of financing whereby internally generated funds (retained earnings) are first used, then debt and finally equity as the last option (Mac an Bhaird and Lucey, 2010, Agliardi et al., 2016, Bhama et al., 2016, Bhama et al., 2017, Kannadhasan et al., 2018). Myers (1984); Smith and Watts (1992); Shyam-Sunder and Myers (1999) and Myers (2001) argue that firms will only opt for debt or equity issuance if they have no internal source of funding or if retained earnings are not sufficient. Due to preference of internally generated funds, firms ensure financial slack using reserves to avoid using external financing (Myers, 1984). For Titman and Wessels (1988b), the most important capital structure determinants should be the firms' history of profitability.

The hierarchy of financing is related to the level of information asymmetry and their relative costs (Newman et al., 2011, Serrasqueiro et al., 2011, Mukherjee and Mahakud, 2012, Pirtea et al., 2014, Agliardi et al., 2016, Bhama et al., 2016, Bhama et al., 2017). Baskin (1989) highlights the importance of asymmetric information and argued that asymmetric information is a key consideration under the pecking order theory. The insinuation of the theory is that a firm's cost of

financing is directly proportionate to its level of information asymmetry (Vasiliou et al., 2009). Pecking order theory assumes that retained earnings have no transaction cost, unlike common stock where the transaction cost is much higher than that of new debt.

Myers and Majluf (1984) suggest that equity should be the last option because its level of information asymmetry is high. This is also due to the pecking order assumption that asymmetric information will lead to mispricing of stock. Mukheijee and Mahakud (2012) argued that the sensitivity of equity to adverse selection and mispricing contributed to its avoidance in the pecking order theory. Myers (1977) argues that firms that are willing to maximise the interests of shareholders will avoid equity issuance since this will lead to loss of control and wealth transfer to new owners.

To minimise asymmetric information, the pecking order theory prefers short-term debt before long-term debt owing to its lower level of information asymmetry. This implies that profitable firms will not borrow in the long-term to finance their new investment. The major limitation of the pecking order theory is its inability to offer an explanation for firms' capital structure decisions when there is no information asymmetry (Yang et al., 2014).

2.4.1 Modified Pecking Order

The pecking order theory, in its modified form, creates a new pecking order, which starts with retained earnings, then equity and finally long-term debt (Chen, 2004, Fama and French, 2005, Delcoure, 2007). In the modified pecking order, the aim is to reduce the cost of capital (see Fama and French, 2005).

The traditional pecking order theory assumed that the information asymmetry problem accompanies all equity issuance and will lead to an increase in issuance cost. However, the modified pecking order theory seems to suggest that if a firm increases its value through issuing over-valued stock,

then there may not be need for the traditional hierarchy of financing. Fama and French (2005) suggest that if the information asymmetry could be avoided when issuing equity it means that equity will no longer be considered the last choice, implying a less significant role of information asymmetry in the firms' capital structure decision. Earlier, Fama and French (2002b) argued that equity issuance does not necessarily imply violation of the pecking order of financing, especially when there is a future need for external financing to implement a new project and when debt issuance will over-stretch the firms' debt capacity. In this case, new shares will be issued to conserve firms' capacity of issuing future debt.

2.4.2 Empirical Studies on the Pecking Order Theory

The pecking order theory has enjoyed the support of numerous studies since it offers a valid and reliable explanation of the relationship between profitability and leverage (Titman and Wessels, 1988a, Harris and Raviv, 1991, Rajan and Zingales, 1995, Booth et al., 2001a, Fama and French, 2002b, Gaud et al., 2005, Degryse et al., 2009, Ahmed Sheikh and Wang, 2011). Shyam-Sunder and Myers (1999) investigated the capital structure decisions of 157 US firms from 1971 - 1989 and found that these firms only use debt when financing their deficit. Their findings support the pecking order theory, which predicts that firms will use their retained earnings as the first financing option to avoid the problem of information asymmetry.

In their study of capital structure and ownership structure, Al-Najjar and Taylor (2008) found that profitability is negatively related to leverage among Jordanian companies. The authors confirmed the prevalence of pecking order behaviour since Jordanian firms show a preference for internally generated funds rather than debt financing.

Akdal (2011), using data of 202 UK companies from 2002-2009, investigated how firm-level factors are related to leverage and found that profitability, volatility and non-debt tax shield has a negative association with leverage. Pirtea et al. (2014) investigated the financing behaviour of 2000

Romanian firms, from 2003-2011, and found that profitable Romanian firms rely more on their retained earnings than on external finance since profitability shows a negative relationship with leverage.

Ilyas (2008) studied the financing behaviour of 364 Pakistani firms from 2000 to 2005 and found that these firms prefer retained earnings and short-term debt before equity, a support for the pecking order theory. In their survey of 272 Turkish firms, Uyar and Guzelyurt (2015) found that Turkish firms follow a pecking order theory and do not set a target debt ratio.

Similarly, Ahmed Sheikh and Wang (2011) examined the determinants of firms' capital structure in Pakistan and document evidence in support of firms' pecking order behaviour as firms' liquidity and profitability increased. They reported that internal funds are used when the liquidity and profitability situation of those firms improved and attributed this to the high cost of securing external finance in Pakistan as a result of underdeveloped capital markets and low levels of trading.

Allini et al. (2018) studied the financial behaviour of 1270 Egyptian firms between 2003-2014 and found that profitable Egyptian firms use more of their retained earnings and less external finance. These firms also issue equity to make up for their financial deficit instead of debt.

2.4.3 Comparing the Trade-off and the Pecking Order theory

From the theoretical and empirical literature, the similarities and differences between both the trade-off and the pecking order theory are observed. For instance, it could be argued that both support firms' use of leverage since debt finance is second in the pecking order hierarchy. However, while the trade-off theory argues for tax shield benefit (Kraus and Litzenberger, 1973, Scott Jr, 1976, Marsh, 1982, DeAngelo and Masulis, 1980, López-Gracia and Sogorb-Mira, 2008), the pecking order theory aims to reduce asymmetric information using internally generated funds as the best

financing option of achieving this (Myers, 1984, Myers and Majluf, 1984). Both theories also differ on their predictions of the relationship between firm characteristics and leverage.

These differences in theoretical positions and predicted relationships among firm-level determinants makes it interesting to investigate whether one of the theories better explains the capital structure choice of Nigerian firms. However, the aim is not to treat both theories as mutually exclusive. This study will identify which one of them enjoys more support in Nigeria, since these two theories are, in several respects, complementary (Cotei and Farhat, 2009, Mukherjee and Mahakud, 2012, Serrasqueiro and Caetano, 2015) and should not be considered to be in an empirical horse race (Fama and French, 2005), in spite of their differences (Barclay and Smith, 2005). Again, the underlying assumptions may also cease to apply under certain circumstances.

2.5 Agency Theory

Agency theory aims to resolve the conflict of interest between the managers of firms and the owners, or among shareholders and bondholders, (Jensen and Meckling, 1976, Fama and Jensen, 1983) and has gained relevance in the capital structure theory (Bancel and Mittoo, 2004). Agency relationship is a result of asymmetric information since managers are better informed than the owners. Morris (1987) argues that if managers seek only their self-interest to the detriment of the owners, it will lead to conflicts, an agency cost that could affect both firms' equity and debt.

The agency cost of equity will lead to a decline in the value of firms' stock when managers are perceived to pursue their self-interest. This will also increase the monitoring cost to ensure that the interest of the owners is protected. The impact of the agency relationship on the capital structure, and the centrality of the asymmetric information in the agency theory, (which is also the underlying assumption in the pecking order theory) make it very important to understand the implication for both the trade-off and the pecking order theory, which are the major theories of this study.

Firms' use of debt reduces the agency cost which arises as a result of conflict of interest between shareholders, managers and providers of debt finance (Jensen, 1986) since using debt implies agreeing to pay out cash on a specified future date. The agency costs of debt include bankruptcy costs and costs of reorganisation, over-payment of dividends, asset substitution and underinvestment problems and also monitoring costs (Smith and Warner, 1979). These costs are included by the debt holders when calculating payment for debt and thus influence the managers' (agents') capital structure decision.

In the free cash flow theory, the use of debt is seen as beneficial to the shareholders, especially in monitoring the opportunistic behaviour of managers to ensure they do not act against the principal's interest of wealth maximisation (Jensen, 1986, Simerly and Li, 2002). Furthermore, through the use of debt, managers' excessive consumption of perquisites, salaries and reputation are subject to greater control (Grossman and Hart, 1982, Williams, 1987) since they are forced to concentrate on interest repayment (Jensen, 1986). The assumptions of the free cash flow theory (Jensen, 1986) imply that firms' capital structure will involve a greater proportion of debt similar to that proposed by the trade-off theory.

However, Jensen (1986) argued that, in a large firm with growth opportunities, it will be less effective to use debt when reducing agency cost. A similar argument is used by the pecking order theory which suggests that, due to asymmetric information, large firms will use less debt and rely more on their retained earnings (Myers, 1984). Myers (1977) suggested that, due to the agency problem, increasing debt ratio will cause conflict between shareholders and bondholders and lead to 'underinvestment' on the part of shareholders. He argued that firms with a high leverage ratio are likely to share a considerable percentage of their profit with bondholders and explained that such firms ignore even projects with a positive net present value when much benefit is expected to accrue to bondholders.

Leland (1998) and Mauer and Sarkar (2005) added the problem of overinvestment to the issue of underinvestment already investigated by previous literature (Myers, 1977, Mauer and Ott, 2000, Moyen, 2007). Mauer and Sarkar (2005) argued that both underinvestment and overinvestment affect the optimal debt to equity mix. Nevertheless, Leland (1998) argued for a minimal impact of the agency cost of overinvestment.

An alternative suggestion was offered by Harris and Raviv (1991), who suggested that the managerial opportunistic behaviour could be minimised by offering managers share options as motivation. If this option is taken, the implication on the firms' capital structure is that there may be a reduction in the firms' leverage ratio if share options increased the level of the firm's equity (see modified pecking order, section 2.4.1) and also a reduction in the cost of capital, since such issuance may involve a low transaction cost (Fama and French, 2005).

These different positions on the use of debt or equity to control managers' behaviour confirm that the agency relationship may help to determine the capital structure of a firm. The reason is that if debt serves as a means of controlling managers (Jensen, 1986), the capital structure of the firm will show more debt when compared to equity. In this situation, it is expected that a firm's profitability, asset tangibility, firm size, age and industry will be positively related to both long-term and short-term leverage of firms, as predicted by the trade-off theory.

However, if the agency relationship results in the use of share options (Harris and Raviv, 1991) or underinvestment (Myers, 1977), then the capital structure is likely to have more equity than debt. Under these conditions, the relationship between leverage and most capital structure determinants used in this study (profitability, asset tangibility, firm age and business risk) is likely to be negative. Thus, this study reviewed the agency theoretical literature because its conclusions are employed in favour of either the trade-off or the pecking order theory, which are the major theories of this study.

2.6 The Market Timing Theory

Market timing theory predicts that managers would reduce the cost of capital by timing equity issuance when they have a higher market value when compared to their book value or past market value (Baker and Wurgler, 2002). The market timing theory suggests that firms' financing choice will reflect the overall result of managers' efforts to target the issuance of equity (Baker and Wurgler, 2002). The authors investigated the equity market timing to explain how to benefit from a temporary fluctuation of equity cost and found that firms issue equity under favourable market condition, which makes equity cheaper than debt. The market timing theory suggests that the market-to-book ratio, which is used by Rajan and Zingales (1995) in measuring growth opportunities, will have negative correlation with leverage (Öztekin, 2015).

Some empirical studies are in support of the market timing theory (Loughran et al., 1994, Graham and Harvey, 2001, Brau and Fawcett, 2006). Graham and Harvey (2001), report findings that firms' executives pay more attention to the timing of equity issuance in their financing decisions. This suggests that the observed negative correlation between profitability and debt ratio is not related to the availability of internally generated funds, as the pecking order theory assumes, but rather due to managers' market timing behaviour which lowers the cost of equity when compared to debt finance. However, Leary and Roberts (2005), report findings that firms do remain within the optimal capital structure through rebalancing their leverage. Similarly, Mahajan and Tartaroglu (2008) found no support for the market timing theory.

2.7 The Signaling Theory

The signaling theory argues that the disparity in the information level could be reduced when the party that possesses more information signals it to the other party with less information (Ross, 1977, Morris, 1987). Similar to the pecking order, agency and market timing theories, the basic assumption of this theory is asymmetric information which, according to (Stiglitz, 2002), means different parties possessing different information. The main purpose of signalling is to reduce asymmetry, especially where the sender and receiver have access to different information (Spence, 2002, Connelly et al., 2011). Prior literature on signaling has distinguished between costly signaling equilibrium (Spence, 1973, Ross, 1977) and costless signaling equilibrium (Brennan and Kraus, 1984). The theory assumes that firms may communicate valuable information to less informed outsiders (investors, lenders, etc.) to bridge the information gap between managers and important stakeholders.

From the signaling, theoretical perspective, the difference between a good firm and a bad firm is the good firm's ability to send a credible signal (Kirmani and Rao, 2000), which will influence the firm's cost of capital in the capital market. Managers are considered to be better informed than external stakeholders. According to the signaling theory, managers will incur an opportunity loss if they fail to use the superior information available to them to their own advantage.

The credibility of the signal depends on its inimitability by other firms who may wish to send the same signal to reduce their cost of capital. Ross (1977) argues that debt financing could serve as a signal to the market about the superiority of the firm. Managers may signal their creditworthiness by using more debt. Similarly, Maçãs Nunes and Serrasqueiro (2007) argue that higher debt ratio signals a firm's quality and maturity to the market. This is in line with the view of trade-off theory and implies that firms' capital structure will involve a greater percentage of debt.

Conversely, Rozeff (1982) also argues that firms' dividend policies may be used as a signal to the market, since increased dividend payment raises the expectation of the investors concerning future earnings, thereby reducing the cost of equity. Firms with high dividend payouts reduce their cost of equity financing since they are able to attract investors and obtain equity finance cheaper.

2.8 Adjustment to Target Leverage

Dynamic capital structure studies support the existence of optimal debt ratio and argue that firms which deviate from their optimum leverage will adjust their leverage upwards or downwards (Lööf, 2004, Gaud et al., 2005, Cook and Tang, 2010, Haron, 2014, Dang and Garrett, 2015, Yang et al., 2015, Chaklader and Jaisinghani, 2017, Ling et al., 2017). Previous studies have shown that this adjustment to target leverage is not costless (Leary and Roberts, 2005, Drobetz and Wanzenried, 2006, Lemma and Negash, 2014). Dynamic capital structure literature has identified that transaction costs (Flannery and Rangan, 2006, Faulkender et al., 2010, Faulkender et al., 2012, Dufour et al., 2018) and deviation costs (Hovakimian, 2004, Drobetz and Wanzenried, 2006, Uysal, 2011, Hussain et al., 2018) influence firms' adjustment behaviour. Transaction has a significant impact on the adjustment speed of firms and includes monitoring, information and bargaining costs (Dufour et al., 2018). On the other hand, a firm experiences deviation costs when its leverage has moved away from the target. Firms are likely to show adjustment towards target leverage when the deviation costs are higher than the transaction costs. Due to firms' need to balance these costs, adjustment to optimal leverage is likely to be partial (Flannery and Rangan, 2006, Tamirat et al., 2017). On the other hand, if these adjustment costs are non-existent, the observed leverage cannot be differentiated from the optimal leverage. Other studies applied models which show how adjustment costs influence SOA (Leary and Roberts, 2005, Drobetz and Wanzenried, 2006, Lemma and Negash, 2014). These studies found that firms' adjustment behaviour will consider both the

benefits and costs of adjustment. This means that firms' adjustment speed will be lower given the higher cost of adjustment (Devos et al., 2017).

2.8.1 Firm Characteristics as Determinants of SOA

Prior studies have identified various factors that influence firms' speed of adjustment (SOA). The majority of these studies found that firm characteristics play a significant role in firms' speed of adjustment (Ozkan, 2001, Hovakimian et al., 2001, Flannery and Rangan, 2006, Byoun, 2008, Clark et al., 2008, Soekarno et al., 2015, Zhou et al., 2016b, Nunes and Serrasqueiro, 2017). The relevance of firm characteristics is due to the differential cost of adjustment (Dang et al., 2012) resulting from the variation in firms' characteristics. Consequently, studies have reported an absence of homogeneity of SOA across firms (Ozkan, 2001, Brendea, 2014, Haron et al., 2013, Buvanendra et al., 2017, Ling et al., 2017, Tao et al., 2017b).

Ozkan (2001) studied the adjustment behaviour of 390 UK firms and found that UK firms adjust their leverage towards target. The author also found that firm characteristics such as size, profitability, firm growth and liquidity are determinants of SOA.

Drobetz and Wanzenried (2006) examined the speed of adjustment of 90 Swiss firms using firm-level variables such as firm size, asset tangibility, profitability and growth opportunities and found firm characteristics to be determinants of SOA. Gwatidzo and Ojah (2014) examined the leverage adjustment behaviour of 178 South African non-financial firms between 1998-2008 and found that firm level variables determined the adjustment behaviour of South African firms in their study sample.

This relevance of firm-level factor is due to the differential cost of adjustment resulting from the firms' characteristics (Dang et al., 2014). Overall, studies suggest varying leverage targets and adjustment speed for firms, arguing that the actual adjustment speed will reflect firms'

characteristics (Zhou et al., 2016a, Tao et al., 2017a, Bystryakov et al., 2018) and depend on how far away the firm is from their leverage target (Dang et al., 2014).

2.8.2 SOA and Bank Lending

Studies also suggest that the type of debt used is likely to influence the adjustment behaviour (De Miguel and Pindado, 2001, Drobetz and Fix, 2003b, Aybar-Arias et al., 2012). The SOA reported for countries where firms use higher public debt proportion, (Flannery and Rangan, 2006, Antoniou et al., 2008, Dang et al., 2011, Abdeljawad et al., 2017) is lower than those reported in countries where firms depend on bank lending (De Miguel and Pindado, 2001).

Studies among US, UK and French firms (where firms have higher access to public debt) show a lower adjustment speed. For instance, Dang et al. (2012), Antoniou et al. (2008) and Flannery and Rangan (2006) document evidence of 30%, 32% and 34% speeds of adjustment respectively for US firms, which confirms the empirical findings of (Lööf, 2004). Similarly, Antoniou et al. (2008), show a 32% SOA for UK firms and 39% for French firms. However, it is important to emphasise that SOA may be influenced by the econometrics procedure (Huang and Ritter, 2009, Dang et al., 2012), making it relevant to apply caution when comparing SOA.

However, studies investigating SOA in bank- dominated economies reported a very high SOA. For instance Drobetz and Fix (2003b) and De Miguel and Pindado (2001) examined the adjustment behaviour of Swiss and Spanish listed non-financial firms respectively and found a very high (about 80%) speed of adjustment. De Miguel and Pindado (2001) argued that this high speed of adjustment is explained by the low level of development of the bond market in Spain and the prevalence of bank lending. Similarly, Drobetz and Fix (2003b) suggest that their high SOA is due to the dependence on bank lending in Switzerland.

2.8.3 Financial Crisis and SOA

Studies show that crisis affects firms' speed of adjustment toward target leverage (Harrison and Widjaja, 2014, Dang et al., 2014, Iqbal and Kume, 2015, Zeitun et al., 2017, Abdeljawad et al., 2017). For instance, Drobetz and Wanzenried (2006) reported an increase in SOA during good times (pre-crisis). Similarly, Dang et al. (2014)) document evidence which shows that the adjustment speed is faster when firms have a financial deficit than when they have a surplus, since these firms are more likely to borrow more under an unfavourable financial situation. Specifically, for the 2008-2009 financial crisis, previous studies found that borrowing capacity was negatively affected by diminished lending and increased lending costs during the financial crisis (Ivashina and Scharfstein, 2010, Harrison and Widjaja, 2014, Zeitun et al., 2017, Ali and Afzal, 2012). According to Zeitun et al. (2017), firms' need for debt increased as a result of the financial crisis but their ability to borrow was limited by the liquidity problem faced by banks during the crisis. Byoun (2008) argued that firms' financing gaps will influence their speed of adjustment to the target leverage

Although the literature on the financial crisis in sub-Saharan Africa emphasised reduced capital inflows during the financial crisis (Brambila- Macias and Massa, 2010, Allen and Giovannetti, 2011), the effect of the financial crisis on firms' capital structure in Sub-Saharan Africa has never been considered. The peculiar circumstances of many developing countries, such as the issue of an illiquid capital market, suggest that the impact of the financial crisis may be significantly different from those experienced by firms in developed countries.

Furthermore, Iqbal and Kume (2015) suggests that firms' dependence on bank lending may affect their level of vulnerability to global financial crises. Since Nigerian firms rely mostly on bank lending, it is, therefore, important to re-examine the determinants of short-term and long-term leverage pre- and post- financial crisis and the speed of adjustment of Nigerian non-financial firms.

2.9 Summary

This study has reviewed both theoretical and empirical literature on both the trade-off and pecking order theories. Unlike the trade-off theory, the idea of optimal debt ratio does not exist in the pecking order theory, since it argues that firms' capital structure choice will reflect their cumulative attempt towards mitigation of information asymmetry (Myers, 1984, Myers and Majluf, 1984). In the traditional pecking order assumption, there is a clear hierarchy of finance whereby firms use retained earnings, debt and then equity where there is no other alternative (Myers, 1984, Shyam-Sunder and Myers, 1999, Fama and French, 2002a). This ranking is dependent on the level of asymmetric information involved (Mukherjee and Mahakud, 2012, Serrasqueiro and Caetano, 2015). It also considers retained earnings free from asymmetric information, which justifies while it dictates the pecking order hierarchy. However, the modified pecking order (Chen, 2004, Delcoure, 2007) argues for the alteration of firms' financing hierarchy in favour of equity over debt when the cost of equity is cheaper than debt. The underlying issue is asymmetric information, which is also the main issue in the agency, market timing and signaling theories.

Furthermore, the current study included agency theory's assumptions on the cost of debt (Jensen and Meckling, 1976). This has led to a more balanced understanding of the trade-off theory than the earlier version, where the risk of bankruptcy is the only identifiable cost of debt (Kraus and Litzenberger, 1973, Scott Jr, 1976). Similarly, the signaling theory addressed the problem of information asymmetry, and is applied in favour of both the trade-off theory (whereby debt could be a signal of credit worthiness) and against the trade-off theory (where constancy of dividend payment signals quality). The market timing theory (Baker and Wurgler, 2002) does not support the idea that the observed negative relationship between leverage and profitability is as a result of firms' retained earnings. The theory, rather, argues that managers' market timing of equity issuance is responsible for the observed negative relationship (Baker and Wurgler, 2002).

Regarding the adjustment speed, prior literature suggest that firm characteristics are determinants of SOA (Ozkan, 2001, Hovakimian et al., 2001, Flannery and Rangan, 2006, Byoun, 2008, Clark et al., 2008, Soekarno et al., 2015, Zhou et al., 2016b, Nunes and Serrasqueiro, 2017) and justifies the use of firm characteristics in this study. Prior studies also suggest that SOA will be influenced by the type of debt (public or private debt) used by firms (De Miguel and Pindado, 2001, Drobetz and Fix, 2003b, Aybar-Arias et al., 2012). Finally, the study considered the impact of the financial crisis on SOA.

Table 2.1: Major Contribution in Capital Structure Debate		
Theory/ contribition	**Author/year**	**Summary of contribution**
Irrelevancy Theory	Modigliani and Miller (1958a)	Capital structure is irrelevant in a frictionless and perfect market.
Recognition of Tax advantage of debt	Modigliani and Miller (1963a)	Debt offers the advantage of a tax shield and is thus preferred to equity.
Recognition of Cost of Financial distress	Kraus and Litzenberger (1973)	Tax advantages of debt need to be traded-off against financial distress cost.
Agency Cost	Jensen and Meckling (1976)	Conflict of interest between managers and owners and impact on debt and equity
'Underinvestment' as a type of Agency Cost	Myers (1977)	Firms forgo investments with positive net present value if benefits accrue to debt holders
Effect of Personal taxes	Miller (1977)	The tax advantage of debt may be off-set by the higher taxes paid on dividends by investors.
Signaling effect on the firms' capital structure	Ross (1977)	Firms' cost of capital could be reduced through signaling.
Pecking order of financing	Myers and Majluf (1984)	Due to information asymmetry, firms will use pecking order of finance
Cost of Adjustment in Dynamic Model	Fischer et al. (1989)	Optimal dynamic policy as a function of firm characteristics
Market timing theory	Baker and Wurgler (2002)	Firm market timing activity reduces cost of capital

Chapter Three: Literature Review and Hypotheses Development

3.1 Introduction

In this section, the current study will review empirical literature on the adjustment speed, the impact of firms' industry and the financial crisis on their financing behaviour. Most importantly, it will review empirical studies on determinants of capital structure and developed studies' hypotheses in this section.

3.2 **Determinants of Capital Structure and SOA**

In this section, this study will discuss firm-level determinants of capital structure and develop hypotheses.

3.2.1 Firm Characteristics as Determinants of Capital Structure

Previous literature has identified determinants of capital structure such as firm size (Rajan and Zingales, 1995, Booth et al., 2001a), firm growth (Titman and Wessels, 1988b, Rajan and Zingales, 1995), asset tangibility (Titman and Wessels, 1988b, Harris and Raviv, 1991, Abor, 2008), age (Gregory et al., 2005, Abor, 2008, Saarani and Shahadan, 2013), profitability (Rajan and Zingales, 1995, Fama and French, 2002b), liquidity (Anderson and Carverhill, 2007, Sharma and Paul, 2015) and business risk (Kim and Sorensen, 1986, Bhaduri, 2002, Al-Najjar and Taylor, 2008). Thus, in this section, empirical literature on the firm characteristics will be reviewed in line with previous studies.

3.2.1 Profitability

The trade-off theory argued that tax deductibility of interest expense and lower default risk will result in higher debt ratios among profitable firms when compared with those that are less profitable (Kraus and Litzenberger, 1973, Scott Jr, 1976). Cardone Riportella and Casasola (2003) also suggested that due to easy access to long-term finance, profitable firms would have high leverage.

This positive association between leverage and profitability has also been expressed by some studies, which argue that debt is a mechanism used in disciplining managers to reduce their ability to consume excessive perquisites (Jensen, 1986, Stulz, 1990).

On the other hand, the pecking order theory generally argues that external finance should only be considered when there is insufficiency or unavailability of retained earnings. According to the theory's hierarchy of financing, retained earnings should be used first, since they are free from asymmetric information (Myers and Majluf, 1984). This is affirmed by Murinde et al. (2004), who found that retained earnings are the principal source of financing. Öztekin (2015) argued that the negative sign of the profitability coefficient reported by the majority of previous capital structure studies is as a result of its positive impact on firms' retained earnings. Consequently, in the pecking order theory, firms' past history of profitability and, hence, the huge level of retained earnings is an important capital structure determinant (Murinde et al., 2004, Titman and Wessels, 1988b, Adesola, 2009). In line with this view, Graham (2000) also reported that low debt ratio is found among large and profitable firms. Using a dynamic model, Flannery and Hankins (2007) found that both the adjustment benefits and costs are influenced by profitability, while Lemma and Negash (2014) show evidence of a lower cost of rebalancing towards optimal leverage for profitable firms.

However, Barton et al. (1989) found a positive relationship between profitability and leverage. Similarly, Petersen and Rajan (1994) found that profitability is positively related to total leverage. Hovakimian et al. (2001) offered a contrasting opinion on this relationship and argued that profitable firms show more preference for equity over debt finance. The authors thus argued that the perceived inverse relationship between leverage and profitability is unrelated to the assumed impact of firms' retained earnings on leverage.

Empirical studies have, however, linked this low appetite for leverage among profitable firms to the type of debt used. For instance, Hall et al. (2000) found a negative relationship between profitability

and short-term leverage. Nevertheless, Michaelas et al. (1999) document a positive relationship between profitability and both long-term and short-term debt. The author argues that profitability has more effect on long-term debt. Long and Malitz (1985) found no evidence of a relationship.

However, the overwhelming evidences in the capital structure theory show that profitable firms are not interested in debt finance (Titman and Wessels, 1988a, Harris and Raviv, 1991, Rajan and Zingales, 1995, Booth et al., 2001a, Fama and French, 2002b, Gaud et al., 2005, Degryse et al., 2009, Ahmed Sheikh and Wang, 2011, Toy et al., 1974, Kester, 1986, Al-Najjar, 2011).

In Nigeria, the illiquid capital market has led to reliance on banks as major suppliers of external finance. Due to the cost of bank loans in Nigeria, non-financial firms will show a preference for internally generated funds before long-term debt finance. It will also be unlikely for these firms to consider costly short-term debt when they have an internal source of funds.

Thus, this study formulates the following propositions based on previous studies:

H1: Profitability is negatively and significantly related to total leverage.

H1a: Profitability is negatively and significantly related to short-term leverage.

H1b: Profitability is negatively and significantly related to long-term leverage.

3.2.2 Asset Tangibility

The degree of tangibility of firms' assets will lead to a greater liquidation value (Titman and Wessels, 1988b, Harris and Raviv, 1991) since the information gap between lenders and shareholders and agency costs may bring about an additional requirement in a form of collateral when securing a loan (Harris and Raviv, 1991). Myers and Majluf (1984) argue that it may be to the advantage of firms if they sell secured debt, since certain costs linked with the issuance of securities are better known by the managers than outside investors. Thus, using tangible assets, whose value is known in securing the debt issued, will ensure that these costs are avoided.

Tangible assets are also important in overcoming the problems of information asymmetry and moral hazards (Di Patti and Dell'Ariccia, 2004) and bridge any gap which may exist between borrowers and lenders (Batten and Hettihewa, 1999). This is because, in a situation of bankruptcy, the market value of tangible assets will easily be ascertained, while intangible assets may have no such value (Antoniou et al., 2008). Consequently, firms with many tangible assets are expected to secure debt financing under more favourable conditions and at a reduced cost (Vătavu, 2012), especially when the specificity of the asset is reduced (Acs and Isberg, 1996, Vilasuso and Minkler, 2001, Kim, 2017).

According to Mackie Mason (1990), debt will be less costly when the value of a firm is heavily dependent on tangible investment already made. This is because a lower risk premium will be demanded by firms with higher tangibility due to the reduced risk of lending (Charalambakis and Psychoyios, 2012). Furthermore, the lenders' acceptance will sometimes not depend on how credit-worthy the firm is, but on the asset's underlying value which outsiders can easily determine (Berger and Udell, 2006). It is argued that agency related costs may increase for firms with reduced tangibility of assets since it is much more difficult for their capital to be monitored (Titman and Wessels, 1988b).

The trade-off theory predicts that tangible assets will be positively correlated with leverage. This means that firms with tangible assets should have higher debt-to-equity since they are able to use their tangible assets to secure this type of external finance (Booth et al., 2001a, Ahmed Sheikh and Wang, 2011, Belkhir et al., 2016). Mackie Mason (1990) suggested that when plants and equipment constitute the greatest part of firms' assets, choosing debt financing will be the most likely option. This may be because issuance of debt secured with these assets will minimise firms' financial distress costs (Psillaki and Daskalakis, 2009, Öztekin, 2015).

Paulo Esperança et al. (2003) report a positive association between asset tangibility and both short-term and long-term debt. Custódio et al. (2013), found that short-term debt is positively related to

asset tangibility since it needs to be constantly renegotiated. However, Nguyen and Ramachandran (2006) documented a negative association between tangibility and total leverage and attributed this to the higher ratio of short-term debt (short-term debt does not require collateral) in their total leverage value.

Similarly, Al-Najjar and Hussainey (2011) document a negative and significant relationship between tangibility and capital structure, which contradicts the trade-off theory. The authors argued that the results represent a trade-off of both agency costs and cost of debt, since firms use debt to control managerial opportunism.

According to Fan et al. (2012), firms in developing countries may require collateral when acquiring short-term debt. This is due to weaker laws, corruption and the need for investors' protection.

The modified pecking order theory (Chen, 2004, Delcoure, 2007) predicts that, when a firm has tangible assets, debt finance may be the unlikely option, since low information asymmetry linked with such assets will make the cost of issuing equity finance to be far lower than that of debt finance (Harris and Raviv, 1991). According to Hall et al. (2004), Sogorb-Mira (2005) and Psillaki and Daskalakis (2009), a negative association exists between short-term debt and asset tangibility. Cornelli et al. (1996) report evidence showing that total leverage is negatively related to tangibility. However, in the capital structure literature, there is overwhelming evidence of a positive relationship between leverage and asset tangibility (Rajan and Zingales, 1995, Michaelas et al., 1999, Booth et al., 2001a, Hall et al., 2004, Chen, 2004, Al-Najjar and Taylor, 2008). If a firm has tangible assets, the likelihood of obtaining cheaper long-term leverage increases, thereby reducing the option of using costlier short-term leverage.

In the case of Nigeria, public debt is not easily obtainable, leading to the reliance of non-financial firms on loans offered by commercial banks and on lease financing. In Nigeria, bankruptcy laws are weak and not properly enforced. Thus, lenders are likely to demand collateral for long-term debt in order to mitigate default risks. However, there may not be a need for collateral when obtaining

short-term debt. Furthermore, since asset tangibility is used in increasing long-term leverage, it will have a negative relationship with short-term leverage.

Thus, this study formulates following propositions based on previous studies:

H2: Asset tangibility is positively and significantly related to total leverage.

H2a: Asset tangibility is negatively and significantly related to short-term leverage.

H2b: Asset tangibility is positively and significantly related to long-term leverage.

3.2.3 Firm Size

Prior studies have identified firm size as a major determinant of firms' capital choice of finance (Titman and Wessels, 1988b, Bevan and Danbolt, 2002, Chen, 2004, Deesomsak et al., 2004, Abor and Biekpe, 2009) since firm size directly influences the issuance cost of both firms' equity and debt. Larger firms are, to some extent, more diversified (Rajan and Zingales, 1995, Vătavu, 2012) with more stable cash flow (Titman and Wessels, 1988b) and less probability of bankruptcy (Nagano, 2003) and are less volatile in their earnings (Fama and French, 2002b). They have also relatively lower monitoring costs (Deesomsak et al., 2004), a lower agency cost of debts and are able to gain access to credit markets easily (Booth et al., 2001a). Thus, Diamond (1989) and Rajan and Zingales (1995) explained that large and mature firms will have a higher reputation in the debt market.

According to Ebel Ezeoha (2008), a firm's size has a direct impact on how it is able to influence different stakeholders. The author argued that the rate of interest paid by large firms, when obtaining a bank loan from Nigerian banks, is lower. This may be due to the advantage of loan size on interest rate concessions (Laudadio, 1963) and the higher collateral value of their tangible assets (Salawu and Agboola, 2008, Campello and Giambona, 2010).

Due to their disclosure requirements, larger firms also have less information asymmetry (Myers and Majluf, 1984) and, as a result, more attractive financial options compared to smaller firms (Gregory et al., 2005, Ebel Ezeoha, 2008). Smaller firms, on the other hand, have less capacity for gaining external finance (Hamilton and Fox, 1998) since they are riskier and experience downgrades in their rating (Guedes and Opler, 1996). They are often confronted with the problem of asymmetric information and are discriminated against when they apply for long-term loan financing (Abor and Biekpe, 2009, Ebel Ezeoha, 2008) unlike larger firms. For instance, Paulo Esperança et al. (2003) argue that smaller firms' risk premium , their lack of diversification and their lower liquidity may contribute to their preference for short-term financing. Ortiz-Molina and Penas (2008) presented a further argument based on debt maturity and show that lenders of debt finance are sometimes not disposed to offer loans with longer maturity to smaller firms to minimise the risk of lending. The trade-off theory argued for a positive correlation between firm size and leverage.

However, other studies have shown evidences of negative relationships between firm size and short-term debt and a positive association with long-term debt finance (Titman and Wessels, 1988b, Chittenden et al., 1996, Cassar and Holmes, 2003, Abor and Biekpe, 2009, Bassey et al., 2014). The empirical work of Michaelas et al. (1999), Chen (2004)and Hall et al. (2004) reported that firm size is negatively related to long-term debt. Sogorb-Mira (2005) found that the size of a firm negatively influences its ability to use long-term debt but has no significant influence on how it uses short-term debt finance. Ebel Ezeoha (2008) found a negative relationship between leverage and firm size. There are also a few other studies that found no significant correlation between all types of leverage and firm size (Stohs and Mauer, 1996, Upneja and Dalbor, 2001, Tang and Jang, 2007, Ferri and Jones, 1979, Chung, 1993).

Pecking order theory is not specific about the impact of firms' size on their leverage decision, since the availability of internally generated funds (which does not depend on firm size) will influence the pecking order of finance.

The overwhelming evidences support a positive association between long-term leverage and firm size (Psillaki and Daskalakis, 2009, Degryse et al., 2009, Abor and Biekpe, 2009, Ahmed Sheikh and Wang, 2011, Abor, 2008, Al-Najjar and Hussainey, 2011, Forte et al., 2013). However, numerous empirical studies on the importance of retained earnings in firms' financing choice report evidence of a negative association between the size of a firm and its leverage ratio (Fama and French, 2002b, Drobetz and Fix, 2003a, Köksal and Orman, 2015). According to Köksal and Orman (2015), debt finance may not be attractive to larger firms due to a lower adverse selection which makes equity issuance more favourable. Similarly, the empirical studies of Faulkender and Petersen (2006) found that the low level of information asymmetry among larger firms will lead to lower debt ratios since these firms will use equity financing rather than debt.

In Nigeria, the size of a firm is positively linked to its collateral value and increases its ability to negotiate with lenders in order to obtain more attractive long-term debt. However, due to competition in the Nigerian bond market, Nigerian non-financial firms are more likely to issue equity instead of short-term debt, which requires constant renegotiation.

Thus, this study formulates the following propositions in line with previous studies:

H3: Firm Size is positively and significantly related to total leverage.

H3a: Firm Size is negatively and significantly related to short-term leverage.

H3b: Firm Size is positively and significantly related to long-term leverage.

3.2.4 Firm Growth

The growth level of firms may have an impact on their capital structure choice since the financial distress cost, free cash flow problems and the agency cost of debt may be increased by growth (Frank and Goyal, 2009). The impact of firm growth on firms' debt-to-equity decisions was investigated by prior literature (Psillaki and Daskalakis, 2009, Kühnhausen and Stieber, 2014). According to Al-Najjar and Taylor (2008), growing firms are more likely to face the agency problem. Myers (1977) argues that firms will reject even projects with positive net present value to

avoid high interest payment and shows in his model how this problem of underinvestment could be resolved with short-term debt. Also, the financial distress cost (Kraus and Litzenberger, 1973, Kim, 1978) and the expected rate of return required by the lenders tend to increase when firms are growing, due to their need of external finance to support their growth. Thus, the trade-off theory predicts a negative relationship between firm growth and leverage since growing firms prefer internally generated funds. Chang and Rhee (1990) found that firms with growth opportunities usually retain their earnings instead of paying dividends and, thus, will be in a position to finance their projects without external finance.

However, the pecking order theory expects a positive relationship between leverage and growth. This is because excess investment needs to bring about an increase in firms' financing needs and debt levels, especially when the firms' retained earnings are not enough to meet firms' financing need. For instance, Hall et al. (2004) stated that internally generated funds may sometimes be insufficient during a growth phase, and suggest that this may, therefore, push a firm into more borrowing.

Similarly, Nguyen and Ramachandran (2006) found evidence that firm growth is positively correlated with short-term debt, and argued that firms with high growth have much need of working capital. This is likely to be the case in Nigeria since firms may be willing to bear the cost of long-term debt when there is an opportunity for a lucrative project, especially when their internal source of funding is insufficient. However, short-term debt may lose its appeal for managers of growing Nigerian firms, especially due to the high level of interest required by lenders (mainly commercial banks). Thus, this study formulates following propositions in line with previous studies:

H4: Firm Growth is positively and significantly related to total leverage.

H4a: Firm Growth is positively and significantly related to Short-term leverage.

H4b: Firm Growth is negatively and significantly related to long-term leverage.

3.2.5 Age

The age of a firm will increase its ability to secure external finance (Diamond, 1989, Gwatidzo and Ojah, 2009). This is because a firm establishes itself in its sector depending on the number of years it has operated successfully. Diamond (1989) argues that the good image established by a firm over a long term will be considered during their lending decision.

Furthermore, a firm's age helps in obtaining a loan since the business shows itself as an on-going business (Gregory et al., 2005, Abor, 2008, Saarani and Shahadan, 2013) and signals their transparent track record (Haas and Peeters, 2006), which helps in reducing the problem of information asymmetry between firms and lenders. According to Sibindi (2016), older firms are likely to generate higher profits. This implies the possibility they have a better earnings retention, suggesting also a negative relationship between age and leverage. La Rocca et al. (2011) found that, as a firm matures, it restructures its capital structure by substituting debt for internally generated funds

On the other hand, gaining access to external finance may be difficult and more costly for younger firms (Cassar, 2004). Similar arguments are used by Berger and Udell (1998) who explain that firms use internally generated funds in their early stages of development and will increase their debt ratio during the maturity stage. They argued that, with more maturity, firms are capable of resolving information asymmetry problems by improving both their private and public reputation. The trade-off theory predicts that older firms will be in a better position to attract debt finance and are, as a result, more likely to have higher debt ratios. However, some studies suggest that the older and the more mature a firm gets, its use of debt finance will be reduced (Hall et al., 2004, Klapper et al., 2006, La Rocca et al., 2011). This negative relationship is expected under the pecking order theory,

which argues that older firms will use less debt since their previously successful years in business may have helped them to boost their retained earnings.

Furthermore, this inverse relationship between age and leverage was found by Hussain and Nivorozhkin (1997), who reported that new firms use more debt financing than mature firms since the reputation of older firms in the stock market makes it easier for them to raise equity finance. They also argue that banks sometimes prefer to lend to new firms since such firms are willing to borrow at all costs and are not overburdened with debt. Supporting this negative relationship, Johnsen and McMahon (2005) and Robb and Robinson (2012) also suggest that, when a firm is in its early stages of development, using external financing is the only available option until it becomes more self-sufficient through profit reinvestment. These studies, therefore, suggest that more established firms will use less debt due to their ability to generate funds internally. Nevertheless, Michaelas et al. (1999), reported that firms' age positively affects their use of long-term debt but has an inverse effect on their ability to use short-term debt.

However, Lemmon and Zender (2001) report findings that the age of a firm has a negative relationship with both short-term and long-term debt finance. Also, Romano et al. (2001), report no evidence on the relationship between leverage and firm age. Older Nigerian firms will be able to obtain affordable long-term leverage due to their reputation with lenders. They are also likely to show a preference for costlier short-term debt. Thus, this study formulates the following propositions based on previous studies:

H5: Firm Age is positively and significantly related to total leverage.

H5a: Firm Age is negatively and significantly related to Short-term leverage.

H5b: Firm Age is positively and significantly related to long-term leverage.

3.2.6 Business risk

The debt level of a firm and the firm's approach to riskier investment will determine its capital structure choices (Kale et al., 1991). According to empirical findings of Bradley et al. (1984), Kim and Sorensen (1986) and Al-Najjar and Taylor (2008), firms with a high level of business risk will use less debt, suggesting that business risk has a negative relationship with leverage. A possible explanation for this relationship is that debt finance is associated with regular periodic repayment to firms' lenders. Thus, a high debt ratio will increase the probability of default. Firms with a high debt ratio are assumed to be in danger of financial distress (Kim and Sorensen, 1986).

Prior literature has also used earnings' volatility as a proxy for the risk of default (Mackie Mason, 1990, Wald, 1999, Antoniou et al., 2008). Firms that are experiencing volatile returns are not likely to have a high leverage ratio (Bhaduri, 2002). Fama and French (2002a) argue that larger firms have lesser earnings volatility, implying that they may have a lower level of business risk.

According to Balakrishnan and Fox (1993), firms in industries with high earnings fluctuations will use more equity. This is to avoid the risk of financial distress, since income fluctuation may mean that firms will be unable to make a regular interest payment associated with debt finance. The majority of the empirical evidences found that firm risk has a negative correlation with leverage (Kim and Sorensen, 1986, Titman and Wessels, 1988b). However, Ramjee and Gwatidzo (2012) found a positive and a highly significant relationship between risk and leverage among South African, non-financial firms.

In Nigeria, the prevalence of bank distress has led to tougher lending policies, ensuring that firms with riskier investments are not granted both short-term and long-term loans or are faced with very high risk premiums. Thus, this study formulates following propositions in line with previous studies:

H6: Business risk is negatively and significantly related to total leverage.

H6a: Business risk is negatively and significantly related to short-term leverage.

H6b: Business risk is negatively and significantly related to long-term leverage.

3.2.7 Liquidity

The relationship between leverage and liquidity is still contested by prior studies. According to Ozkan (2001), the impact of firms' liquidity on their capital structure decision may be two-fold. Firstly, there is a possibility of a higher level of short-term leverage among firms with higher liquidity since they aim to settle short-term obligations when due, meaning a positive correlation between short-term leverage and a firm's liquidity. According to Degryse et al. (2012), firms that are illiquid may be unable to attract long-term debt finance due to a high bankruptcy risk. This also implies a positive relationship between liquidity and long-term leverage. The trade-off theory supports this positive relationship between liquidity leverage, since liquidity ensures a firm's ability to meet its contractual obligations. According to Tauringana and Clarke (2000), a firm with high liquidity shows its ability to pay its current obligation.

On the contrary, firms' liquidity may provide an opportunity for firms to finance their assets without borrowing, meaning in this case that a negative relationship is expected for both types of leverage. Lipson and Mortal (2009) found that firms' liquidity will affect their cost of capital, making equity issuance a better alternative when compared with debt. Based on this view, a negative and significant relationship between long-term leverage and liquidity will be expected. Ozkan (2001) reports a similar negative relationship between liquidity and long-term debt among UK firms, which

is as predicted by the pecking order theory. The assumption of the theory is that firms with an internal source of finance will reduce their reliance on debt (Myers, 1984, Myers and Majluf, 1984, Shyam-Sunder and Myers, 1999).

However, for short-term leverage, the pecking order theory accepts a positive relationship with liquidity. For instance, Myers (1977) argued that short-term leverage may be used to reduce the asymmetric information between a firm and its investors. A negative relationship between different measures of liquidity and leverage was found by Sharma and Paul (2015). The author argued that this negative correlation, found overwhelmingly in developed countries, may not be applicable to developing countries due to their less sophisticated economy, higher asymmetric information, the underdeveloped capital market and over-reliance on bank lending. This argument is not justifiable since other studies in developing countries have also documented a negative and significant relationship between liquidity and leverage (Deesomsak et al., 2004, Ahmed Sheikh and Wang, 2011).Due to the high cost of short-term leverage and the burden of renegotiation, it is expected that Nigerian firms with high levels of liquidity will use less short-term leverage. Thus, this study formulates following propositions based on previous studies:

H7: Liquidity is negatively and significantly related to total leverage.

H7a: Liquidity is negatively and significantly related to short-term leverage.

H7b: Liquidity is negatively and significantly related to long-term leverage.

3.3 Determinants of Capital Structure before and after the Financial Crisis

Few studies on the effect of the financial crisis on firms' capital structure show that capital structure determinants vary before and after the financial crisis (Akbar et al., 2013, Harrison and Widjaja, 2014, Iqbal and Kume, 2015). For instance, Zeitun et al. (2017) examined the impact of the financial crisis on the capital structure of Gulf Corporation Council (GCC) countries and found smaller variation in the leverage ratio after the crisis than before the crisis period . This suggests that firms use debt sparingly after the crisis. They also reported that firms' risk (earnings volatility) show a significant increase (27.9%) from their pre-crisis value (17.26%) while the asset tangibility figure jumped slightly (39.98%) from its value before the crisis (38.73%). However, they reported a very dramatic decrease (7.12%) in firm growth from the pre-crisis value (21.45%). This shows that capital structure determinants vary before and after the crisis.

Harrison and Widjaja (2014) examined the impact of the financial crisis on the capital structure of US S&P companies and found the correlation coefficient of asset tangibility showed significant increase after the financial crisis, while the profitability effect declined. Furthermore, the impact of this financial crisis on German, French and UK firms was examined by Iqbal and Kume (2015). They found that leverage ratios went back to their pre-crisis period immediately after the crisis and that highly leveraged firms (before the crisis) acquired less debt after the crisis while firms with low leverage acquired more debt.

Akbar et al. (2013) also found that the crisis affected firms' short-term debt negatively, but had no significant impact on the long-term debt of UK firms. Due to reduced capital inflow during the financial crisis, capital structure determinants of Nigerian non-financial firms will vary before and after the financial crisis. However, since short-term leverage of Nigerian non-financial firms is very low, its determinant is unlikely to change.

H8: Determinants of total leverage will vary before and after the financial crisis.

H8a: Determinants of short-term leverage will vary before and after the financial crisis.

H8b: Determinants of short-term leverage will remain the same before and after the financial crisis

3.4 Determinants of SOA

In this section, the current study reviews empirical literature on the impact of firms' degree of indebtedness, firm size and industry on SOA. It will also discuss the impact of the financial crisis on SOA.

3.4.1 SOA and Degree of Indebtedness

It has also been found that the degree of a firm's indebtedness (over-leveraged or under-leveraged) is likely to affect SOA (Lemmon et al., 2008, Abdeljawad et al., 2017). For instance, Abdeljawad et al. (2017) found that the SOA of over-leveraged firms is higher than that of under-leveraged firms. Prior literature argues that higher distress probability carries with it a high cost of deviation, which is far greater than adjustment costs and is likely to lead to faster adjustment speed (Clark et al., 2008, Dang et al., 2014). This higher distress probability may be as a result of higher borrowing; the agency problem between shareholders and debt holders (Jensen and Meckling, 1976). However, Byoun (2008) argues that highly leveraged firms have less cost efficient financial options which may affect their overall SOA. These financing costs may be significant if these firms are financed through costly bank lending and are likely to lead to higher adjustment.

Abdeljawad et al. (2017) recognised that under-leveraged firms also have costs to shoulder, such as the loss of a debt tax shield. However, these costs are incomparable with those of over-leveraged firms (Abdeljawad et al., 2017). Strebulaev and Yang (2013), having studied under-

leveraged firms, found that it is less costly for firms to have a low leverage ratio, which implies that their adjustment speed will be moderate or slow. Flannery and Hankins (2007) argue that the SOA asymmetry between over-leveraged and under-leveraged firms is due to asymmetry in the cost of deviating from leverage targets. In spite of an over-reliance of Nigerian non-financial firms on bank lending, the overall debt in their capital structure is low. This low level of debt will decrease the transaction costs of over-leveraged firms, leading to a reduced speed of adjustment. However, for under-leveraged firms, the SOA will be higher since these firms intend to close their financing gap. Thus, this study formulates the following propositions:

H1a: SOA will be low for over-leveraged firms due to a lower cost of deviation from target leverage.

H1b: SOA will be higher for under-leveraged firms due to a higher cost of deviation from their target leverage.

3.4.2 SOA and Firm Size

Prior studies have also identified firm size as a major determinant of capital structure choice (Titman and Wessels, 1988b, Bevan and Danbolt, 2002, Chen, 2004, Deesomsak et al., 2004, Abor and Biekpe, 2009) and argue for its impact in the speed of adjustment (Flannery and Hankins, 2007, Byoun, 2008, Castro et al., 2014). Large firms have lower issuance costs for both debt and equity (Lemma and Negash, 2014) which may lead to a higher speed of adjustment for large firms (Castro et al., 2014). Lemma and Negash (2014) argue that, due to minimal levels of financial distress costs for larger firms, it will be unlikely that these firms will show any speedy adjustment.

Smaller firms have less capacity of gaining external finance (Hamilton and Fox, 1998) since they are riskier and experience downgrades in their rating (Guedes and Opler, 1996). Smaller firms are often discriminated against when they apply for debt finance (Abor and Biekpe, 2009, Ebel Ezeoha, 2008). Thus, the low level of their tangibility and lack of diversification increases their issuance cost for debt and equity. This implies that the financing gap of smaller firms will be greater, thus necessitating their need for speedier adjustment towards target leverage.Based on this view, it is expected that smaller firms will adjust both their short-term and long-term debt quickly.

Larger Nigerian firms are likely to obtain debt finance more cheaply since they are considered too big to fail, unlike smaller firms. Thus, their size reduces the risk of default and possibility of financial distress. This means that they may be reluctant to adjust their leverage unlike smaller firms. Thus, this study formulates the following propositions:

H2a: SOA will be slow for large firms due to reduced benefits of adjustment.

H2b: SOA will be higher for smaller firms to enable them close their financing gap.

3.4.3 Industry and SOA

Prior literature suggests that firms' industrial affiliation may have an impact on their capital structure decisions (DeAngelo and Masulis, 1980, Masulis, 1983, Harris and Raviv, 1991, Frank and Goyal, 2009, MacKay and Phillips, 2005). Frank and Goyal (2009) used industry to represent certain omitted factors, which are similar to all firms in their study.

According to Masulis (1983), there will be a similarity of leverage ratio for firms within a particular industry. A similar finding was reported by Roberts (2002), who documented evidence of significant variation in the adjustment speed to target leverage across industry. These differences may be as a result of differences in costs and benefits of adjustment in different industries. Nigerian non-financial firms are expected to follow similar leverage targets set within their industry due to the similarity of operation. Furthermore, Nigerian non-financial firms are likely to have similar asset structures to

that which is found within their industry. Since the tangibility of assets infuences the cost of bank lending in Nigeria, the overall adjustment speed of firms that belong to a particular industry is expected to be the same. However, this will vary across industries.

H3a: Firms adjust their leverage to industry averages

H3b: SOA varies across Nigerian Industries

3.4.4 Financial Crisis and SOA

Prior studies have shown the impact of the economic state on the adjustment behaviour of firms (Lööf ,2003; Banerjee, 2004, Hackbart, 2006, Cook and Tang, 2010; Drobetz et al., 2015). Zeitun et al. (2017) found that firms' adjustment to target leverage is slow after the financial crisis when compared to pre-crisis SOA. They argue that this may be linked to the limited supply of debt finance immediately after the crisis. A similar result, showing a reduction in SOA during the crisis, was found by Ariff et al. (2008), and suggests that the cost of finance may outweigh the benefit of being within the target.

Since Nigerian firms obtain long-term debt more cheaply do not need to renegotiate this type of debt in the short-term, the cost of speedy adjustment may likely be more than its benefits. Thus, it is likely that Nigerian non-financial firms may be reluctant to show speedy adjustment even after the financial crisis. However, short-term debt needs to be constantly renegotiated and is costlier, meaning that it may be more beneficial for firms to adjust speedily in the direction of their leverage target.

H4a: Firms adjust their long-term leverage slower after the financial crisis

H4b: Firms adjust their short-term leverage faster after the financial crisis.

Table 3.2: Summary of the Study Hypotheses on Capital Structure Determinants		
H1	**Profitability is negatively and significantly related to total leverage**	Pg. 40
H1a	Profitability is negatively and significantly related to short-term leverage	Pg. 40
H1b	Profitability is negatively and significantly related to long-term leverage	Pg. 40
H2	**Asset tangibility is positively and significantly related to total leverage**	Pg. 43
H2a	Asset tangibility is negatively and significantly related to short-term leverage	Pg. 43
H2b	Asset tangibility is positively and significantly related to long-term leverage	Pg. 43
H3	**Firm Size is positively and significantly related to total leverage**	Pg. 45
H3a	Firm Size is negatively and significantly related to short-term leverage	Pg. 45
H3b	Firm Size is positively and significantly related to long-term leverage.	Pg. 45
H4	**Firm Growth is positively and significantly related to total leverage**	Pg. 47
H4a	Firm Growth is positively and significantly related to short-term leverage	Pg. 47
H4b	Firm Growth is negatively and significantly related to long-term leverage	Pg. 47
H5	**Firm Age is positively and significantly related to total leverage**	Pg. 49
H5a	Firm Age is negatively and significantly related to short-term leverage	Pg. 49
H5b	Firm Age is positively and significantly related to long-term leverage	Pg. 49
H6	**Business risk is negatively and significantly related to total leverage**	Pg. 50
H6a	Business risk is negatively and significantly related to short-term leverage	Pg. 50
H6b	Business risk is negatively and significantly related to long-term leverage	Pg. 50
H7	**Liquidity is negatively and significantly related to total leverage**	Pg. 51
H7a	Liquidity is negatively and significantly related to short-term leverage	Pg. 51
H7b	Liquidity is negatively and significantly related to long-term leverage	Pg. 51
H8	**Determinants of total leverage will vary before and after the financial Crisis**	Pg. 53
H8a	Determinants of short-term leverage will vary before and after the financial crisis.	Pg. 53
H8b	Determinants of short-term leverage will remain the same before and after the financial crisis.	Pg. 53

Table 3.3: Summary of the Study Hypotheses on SOA		
H1a	SOA will be low for over-leveraged firms due to a lower cost of deviation from target leverage	Pg. 54
H1b	SOA will be higher for under-leveraged firms due to a higher cost of deviation from their target leverage.	Pg. 54
H2a	SOA will be slow for large firms due to reduced benefits of adjustment	Pg. 55
H2a	SOA will be higher for smaller firms to enable them close their financing gap	Pg. 55
H3a	Firms adjust their leverage to industry averages	Pg. 56
H3b	SOA varies across Nigerian Industries	Pg. 56
H4a	Firms adjust their long-term leverage slower after the financial crisis	Pg. 56
H4b	Firms adjust their short-term leverage faster after the financial crisis	Pg. 56

3.7. Summary

In this chapter, the study reviewed empirical literature and developed hypotheses on the determinants of capital structure and SOA. It started with the review of literature regarding determinants of capital structure, which are firm characteristics; profitability, asset tangibility, firm size, firm growth, age, business risk and liquidity. The aim is to establish a relationship between this firmlevel factor and three types of leverage (total, short-term and long-term leverage) which are used as independent variables in this study. It also examined how the financial crisis affects the capital structure determinants.

Furthermore, the speed of adjustment literature was reviewed, especially regarding the impact of firms' level of indebtedness (over-leveraged and under-leverage firms) and size on their SOA. This is important to understand how the debt level and the size of a firm affect its adjustment behaviour. Finally, the study discussed the impact of the financial crisis on the SOA of total long-term and short-term leverage to determine the impact of reduced capital inflow during the 2008-2009 financial crisis on the SOA.

Chapter Four: Methodology

4. Introduction

In this chapter, the criteria for selection of the study sample and the methods used in this study will be discussed in detail in line with the aim and the objectives of this research. It starts by discussing the ontological and epistemological principles that are applied in this research since these have influence on the choice of data andits measurement and analysis. This is organised in 4 sections: Section 4.1 discusses the research philosophy with subsection 4.1.1 focusing on research design. Section 4.2 discusses the sample size and data collection while section 4.3 considers the measurement of study variables; dependent variables (subsection 4.3.1) and independent variables (subsection 4.3.2). Data analysis and the empirical model are discussed in sections 4.5 and 4.6, followed by the summary of the whole chapter in section 4.8.

4.1 Research Philosophy

The obscurity surrounding basic research concepts (Morse et al., 2002) has made it difficult for researchers to understand how methodology and methods used in a particular research could be traced to the underlying paradigm (Burrell and Morgan, 1979, Morgan, 2007, Arghode, 2012, Aliyu et al., 2014). Thus, in social science, it is important for the researcher not only to select an appropriate research paradigm (Burrell and Morgan, 1979, Mackenzie and Knipe, 2006) but to understand the methodological implication (Guba and Lincoln, 1994, Morgan, 2007, Arghode, 2012, Aliyu et al., 2014).

Research in social science could be viewed from either the objectivist or the constructivist paradigms that have divergent ontological and epistemological assumptions (Bryman, 1984, Christians and Carey, 1989, Byrne, 2001, Angen, 2000, Hall, 2003, Furlong and Marsh, 2010). Ontological assumptions deal with how a social phenomenon presents itself to the actors (Morgan and Smircich, 1980, Hall, 2003, Carter and Little, 2007). The epistemology is also very important;

the understanding of whether the social actors construct the social reality themselves or whether they are externally presented (Burrell and Morgan, 1979, Bryman, 1984, Hay, 2007).

Previous literature overwhelmingly argues that the underlying philosophy should be reflected in its methodology and methods (Harding, 1987, Schwandt, 2000, Carter and Little, 2007). This means that the ontological and epistemological basis of any research should be evident in its methodological and methodical approach. In line with this view, Carter and Little (2007) argue for the 'epistemic content' of methodology. This means that each methodology is built on a particular epistemological tradition. This view is related to the paradigm incommensurability of Kuhn (1996) advocated by both quantitative purists (Schrag, 1992, Maxwell and Delaney, 2004) and qualitative purists (Leininger, 1994, Schwandt, 2000).

These divergent epistemological assumptions raise concerns regarding how a discipline defines its own acceptable knowledge (Bell and Bryman, 2007). Most importantly, in the context of research, the choice of a suitable methodology will depend on the phenomenon which a researcher intends to investigate and on the philosophical paradigm chosen (Byrne, 2001, Mackenzie and Knipe, 2006, Carter and Little, 2007). Consequently, this study will briefly introduce both the objectivist's and constructivist's paradigms by highlighting their basic assumptions.

For objectivist researchers, using the natural science method ensures precision and objectivity when analysing the social phenomenon (Bryman, 1984, Schrag, 1992, Carey, 1993, Bryman and Bell, 2003, Aliyu et al., 2014). This is called the positivist paradigm because it assumes that only one truth exists which is independent of the researcher's perception (Sale et al., 2002). Through the description of reality in a manner that ensures their measurability, the positivist's paradigm operationalises the underlying concepts (Collis and Hussey, 2009). The positivist researchers search for causal relationships and irregularities that present themselves in the phenomenon which is investigated to give explanation to, or to predict the happening of, the social world.

The quantitative research approach is employed in the positivist's research to test the hypothesis (Newman and Benz, 1998). This approach uses statistical tests of the study sample (Goertz and Mahoney, 2012) to achieve its objective since its epistemology assumes that the researcher has the capability of investigating a social phenomenon without changing it or being changed by it (Guba and Lincoln, 1994). Also the quantitative research approach uses a large sample size, unlike the qualitative approach, to ensure that the study sample represents the entire population investigated (Carey, 1993). A deductive approach is employed in a positivist study which enables the hypothesis to be developed based on the existing literature and consequently tested with the empirical data (Collis and Hussey, 2009). Quantitative research starts with the review of relevant theories. Furthermore, the empirical results of such a study are generalisable to the whole population, especially if the large sample size is randomly collected. This makes the outcome of such a deductive study to be highly reliable so that similar results are achievable, especially when similar methodology is employed by other studies (Collis and Hussey, 2009).

Unlike the objectivist paradigm, the claim of constructivist research is that truth is not necessarily universal since it depends on the perspective of the individual. Constructivism depends on the theory of social interaction in the creation of knowledge (Carter and Little, 2007). This paradigm emphasises the important role of the subjective judgement of the researcher in the creation of knowledge. In constructivist research, the activities of the business can only be analysed by individuals involved since, under this paradigm, business reality is socially constructed. The qualitative research approach is based on the constructivist approach (Guba and Lincoln, 1994). This type of research begins with observation of reality and employs a qualitative research approach which enables the explanation of observation and the establishment of its theoretical basis (Goertz and Mahoney, 2012).

Constructivists' ontology assumes that one's construction of reality will lead to different views of reality (Sale et al., 2002), since reality is considered relative and multiple within this paradigm

(Hudson and Ozanne, 1988). This makes it necessary to uncover motives, meaning and other subjective experiences which are time and context specific (Neuman, 2002). Furthermore, based on its concept of knowledge and how knowledge is gained , the qualitative research assumes that reality does not exist independently of the researchers' mind since the researcher and the object studies are in a relationship in such a way that it facilitates the findings of the object investigated (Guba and Lincoln, 1994).

The qualitative researcher maintains a close relationship with the participants and their realities. This is to ensure that the dynamism and complexity of reality is appropriately uncovered (Hoepfl, 1997, Morgan and Smircich, 1980). This is also to generate a very rich ('thick')description of the phenomenon under investigation by taking into account its actual context to preserve the meaning ascribed in the research process (Gephart, 2004).

Constructivists' epistemology contradicts that of positivism since it emphasises the subjective dimension of science, whereby a personal meaning is imposed on a phenomenon (Husserl, 1962). This paradigm encourages a different science wherein scientists' preoccupation does not involve mere observation of reality (Morgan and Smircich, 1980). Its epistemology advocates the interpretation of reality to understand the social world (Johnson, 1987).

These two approaches have resulted from either qualitative or quantitative research which have different ways of collecting and analysing data (Gelo et al., 2008). Qualitative research uses a non-numeric approach when collecting information (Berg, 2004, Babbie, 2013). The qualitative method is capable of capturing specific behaviour and attitudes among the phenomenon investigated (Babbie, 2013). This approach has different disadvantages which makes it inappropriate for this research. Firstly, it often uses a small sample size that is not representative of the whole population (Hakim, 1987) and offers a low level of transparency and reliability (Berg, 2004). Secondly, it takes a lot of time to conduct meaningful qualitative research (Berg, 2004).

The quantitative approach, on the other hand, reduces the phenomenon to measurable numerical values (Gelo et al., 2008) and employs different statistical analysis in its measurement which makes it more reliable and generalisable. Although Newman and Benz (1998) suggest that none of the research approaches is superior to the other, Goertz and Mahoney (2012) argue that the differences in qualitative and quantitative methods are attributable to the difference in culture and their compromises when establishing causal relationships between phenomena, while Sale et al. (2002) extend these differences beyond mere methodological and philosophical differences, to include differences in the language of description.

To understand the determinants of capital structure choice among listed firms in Nigeria, quantitative research is deemed more appropriate because the study uses secondary data and seeks a relationship (based on statistical analysis) between firm-level characteristics and three types of leverage (total, long-term and short-term leverage).

4.1.1 Research Design

In its research design, this study assumed that objectivism (positivist epistemology), which involves the application of natural science techniques, will be more relevant to the analysis of the social phenomenon under investigation. This is because the phenomenon investigated in this study lends itself to positivists' research because of the assumption of positivism that reality is external to the researcher and presents itself in an objective manner. The study investigates the partial correlations between different firm-level variables and leverage measures (which are based on pre-existing financial information in firms' annual reports) to understand the capital structure choice of listed firms in Nigeria Thus, the positivists' paradigm will be the most suitable.

In accordance with the majority of empirical studies (Gregory et al., 2005, Abor, 2008, Saarani and Shahadan, 2013, Bassey et al., 2014, Pirtea et al., 2014), this study adopts a positivist research

approach in its investigation of capital structure determinants among listed non-financial firms in Nigeria for the following reasons:

- The researcher's view of the reality is in line with the objectivist's ontology which argues that social reality is not created by social actors but is external, and presents itself in an objective manner.
- The researcher's view regarding epistemology and the creation of knowledge reflects the objectivist's understanding.
- In this study, a large sample size is used in line with positivist research. Furthermore, using the positivists' paradigm will ensure the operationalisation of the underlying concepts in this study (Collis and Hussey, 2009). Thus, this study discusses how both the dependent variables and the independent variables used in this study are measured.

  Similarly to other positivists' studies, a deductive approach will be employed in this research. This study uses major capital structure theories, which are the trade-off theory and the pecking order theory, and employs other supporting theories (market timing, agency and signalling theories) to explore the relationship among the phenomena under investigation. To increase the generalisability of the empirical results, the current study uses the entire population, excluding missing values, with the overall aim of producing a highly reliable result that ensures generalisability and the similarity of the research outcome when the method is replicated.

4.2 Sample and Data Collection

In this section, this study will discuss the sample size and data collection techniques employed.

4.2.1 Sample Size

The population of this work is made up of 139 non- financial firms listed on the Nigerian Stock exchange (NSE) from 2000-2015. A 15-year period was adopted so as to enable reliable statistical estimations for the relationships among the dependent and independent variables used in this research. This period was also relevant since the third objective of this study is to observe the capital structure determinants (for total, long-term and short-term leverage) in two different periods, before the financial crisis (from 2001-2007) and after the financial crisis (from 2010-2015). The study excluded 12 companies which are listed after 2001 or delisted during the period of the study.

The final sample of this study is made up of 127 non-financial firms which is about 67 % of the total population as seen in Table 4.1. Furthermore, the firms in the sample are divided into 10 sectors in line with Nigerian stock exchange (NSE) classifications.

Table 4.1: Sample Selection

Description	Number of Companies	Number of Observations
Total of non-financial Companies	139	2085
Firms listed or delisted after 2001	12	180
Total Final Sample	127	1905

4.2.2 Data Collection

The secondary data used in this research was collected from the published financial statements of all publicly listed non-financial firms that make up the sample of this study. These financial statements were taken from the OSIRIS Database. Prior studies have chosen the annual report as the source of secondary data since information on the past transaction of the business, which is necessary for adequate firm-level analysis, is available (Gaud et al., 2005).

For the purpose of investigating the determinants of short-term and long-term leverage among listed Nigerian non-financial firms, data were collected for the whole period (2001-2015). This long period ensures adequate and reliable observation. Furthermore, two unequal periods (2001-2007 and 2010-2015) are used in this study to investigate firms' capital structure before and after the financial crisis. It excluded the years 2008-2009, which are considered the peak of the crisis. This is because, during the financial crisis, firms' access to external finance was restricted due to the economic downturn (Ivashina and Scharfstein, 2010, Dang et al., 2014, Harrison and Widjaja, 2014, Iqbal and Kume, 2015). This work assumes that overlooking the impact of the financial crisis by considering the whole period may be inappropriate.

The data collected are from firms across 10 industries, as seen in table 4.2. This diverse background of data is very important in ensuring the validity of the study result. Prior literature (DeAngelo and Masulis, 1980, Masulis, 1983, Harris and Raviv, 1991, Frank and Goyal, 2009) argues that firms' industry will play a major role in their capital structure decisions.

Table 4.2: Classification of firms according to their Industry

Industrial Classification (NSE)	Proportion Based on full Sample
1) Consumer Goods	25
2) Services	23
3) Industrial Goods	22
4) Healthcare	11
5) Oil and Gas	11
6) IT and Computer Technology	9
7) Construction and Real Estates	9
8) Conglomerates	6
9) Agriculture	6
10) Natural Resources	5
Total	127
The Nigerian Stock Exchange (NSE) classifies firms into 12 different industries. However, this study excludes financial service and utility firms.	

4.3 Measurement of Variables

In this section, the current study shows how dependent and independent variables will be measured.

4.3.1 Measurement of dependent variables

In its definition of a dependent variable, the current study employed a broader measure of short-term and long-term and total liabilities, which is scaled against total assets in line with prior studies (Bevan and Danbolt, 2002, Abor, 2008, Psillaki and Daskalakis, 2009, Köksal and Orman, 2014, Degryse et al., 2012).

In Nigeria it is common to use trade credit in financing, hence the term leverage will be most appropriate. The reason for differentiating between long-term and short-term leverage is that each type of leverage shows considerable differentiation in terms of maturity, terms and contingencies of pay out, interest rate concession and the priority during the situation of bankruptcy (Berglöf and Von Thadden, 1994, Michaelas et al., 1999, Bevan and Danbolt, 2002, Upneja and Dalbor, 2001). Bevan and Danbolt (2002) argue that the relationship between firm

characteristics and leverage depends on the type of leverage analysed. This study also includes different measures of leverage as a dependent variable to examine whether the financing behaviour of Nigerian firms is in line with the trade-off or the pecking order theory. While the pecking order theory seems to favour short-term debt to minimise asymmetric information (Myers and Majluf, 1984, Myers, 1977), the trade-off theory prefers long-term since this type of debt is assumed to offer a better tax shield (DeAngelo and Masulis, 1980, Harrison and Widjaja, 2014) and constancy of interest payment (Guedes and Opler, 1996) which helps firms in gaining a tax advantage.

4.3.1.1 Total Leverage

The total leverage of a firm is the combination of long-term leverage and short-term leverage and shows the total non-equity capital used by a firm. Rajan and Zingales (1995) argue that total leverage is a proxy of the shareholders' stake in the case of liquidation. In the definition of total leverage, items such as accounts payable are included (Drobetz and Wanzenried, 2006). Several proxies have been used for measuring total leverage by previous literature since the definition of leverage is dependent on the kind of analysis intended (Mukherjee and Mahakud, 2012) and on the study objective (Rajan and Zingales, 1995). In his study of the capital structure determinants among Swedish companies, Song (2005) use total liabilities as a proxy for total leverage which is scaled against total assets. The result showed a yearly average leverage of 80 percent with a corresponding median value of 81%. This may be due to inclusion of other short-term liability in the measurement. For instance, Bevan and Danbolt (2002) added trade credit to total debt, disregarding Rajan and Zingales (1995) view of trade credit as a financing transaction which may increase firms' leverage ratio disproportionately. This which will be measured as the ratio of book value of total debt to the book value of total assets, in line with the majority of empirical studies (Pandey, 2001, Bevan and Danbolt, 2002, Ebel Ezeoha, 2008, Xu and Li, 2014, Belkhir et al., 2016).

4.3.1.2 Long-term Leverage

Long-term leverage represents the liabilities of a firm which are expected to be repaid over a year, such as bank loans, debenture or other long-term obligations. They are sometimes referred to as fixed liabilities or funded debt (Guerard Jr and Schwartz, 2007). Long-term debt is cheaper than equity and may be advantageous when there is fluctuation in the interest rate (Brick and Palmon, 1992).

Agency literature has pointed out the possibility of firms' unique capital structure decision as a result of long-term debt such as agency cost considerations (Jensen and Meckling, 1976), managerial implication of the free cash flow theory (Jensen, 1986) and underinvestment (Myers, 1977). In line with the free cash flow theory (Jensen, 1986, Stulz, 1990), the empirical findings of D'Mello and Miranda (2010) show that long-term debt is important in reducing firms' abnormal capital expenditure. Long term debt is also linked with high fixed costs (Dalbor and Upneja, 2002) and is more sensitive to mispricing (Kale and Noe, 1990). Owing to the role of long-term debt in the trade-off theory, examining this type of debt and statistically showing the relationship with independent variables (firm-level determinants) will lead to a better understanding of the capital structure decisions of Nigerian firms.

Although several measurements have been used for long-term leverage, this study will measure long-term debt against the total asset (LTD/TA) in line with prior studies (Michaelas et al., 1999, Pandey, 2001, Chen, 2004, Bas, 2012).

4.3.1.3 Short-term Leverage

Short-term leverage is debt that is liable for repayment within one year. This type of debt includes accounts payable, short-term bank loans and the proportion of the long-term loan due for repayment in the current financial year. Although short-term debt is not considered in a strict notion of capital structure (Ahmed Sheikh and Wang, 2011, Jõeveer, 2013), it is indispensable in the financing decision of firms in developing countries (Fan et al., 2012). Furthermore, short- term debt may be

preferred by firms to long-term debt because debtors are more committed to its repayment (Nunes and Serrasqueiro, 2017), especially where future cash flows are not easily predicted (Berglöf and Von Thadden, 1994).

In addition, firms may prefer using short-term debt since it minimises the underinvestment problem (Myers, 1977). However, short-term debt has to be frequently arranged and may not be renegotiated, if there is any change in firms' circumstances. This may adversely affect the firm's ability to carry out its operation. When retained earnings are unavailable or insufficient, the pecking order theory will prefer this type of finance due to lower asymmetric information and lower agency costs (Myers and Majluf, 1984). Owing to the use of trade credit in short-term financing, this study uses the broader term, leverage. It also measures short-term debt against total assets (STD/TA) in line with prior empirical studies (Pandey, 2001, Abor and Biekpe, 2009, Bas, 2012).

4.3.2 Measurement of Independent variables

It is not unlikely that various factors will influence the financing behaviour of Nigerian non-financial firms since determinants of firms' capital structure are very extensive and indeterminate. Prior literature has identified firm characteristics (Artikis et al., 2007, Maheshwari, 2016, Sethi and Tiwari, 2016) and firms' institutional environments (Öztekin and Flannery, 2012, Gwatidzo and Ojah, 2014, Baltaci and Ayaydin, 2014).

However, since the aim is to study the capital structure of firms in a single country, examining firm characteristics that affect firms' capital structure in Nigeria is most appropriate. This study considers firm level variables that are closely related to the trade-off theory and the pecking order theory, which are considered the major theories of this study. Three of these independent variables, such as firm size, profitability and asset tangibility, are the most frequently researched variables (Nguyen et al., 2014). These variables have been investigated by the majority of capital structure research (Abor and Biekpe, 2006, Heyman et al., 2008, Abor and Biekpe, 2009, Ahmed Sheikh and Wang, 2011,

Charalambakis and Psychoyios, 2012, Eldomiaty et al., 2014, Bassey et al., 2014, Köksal and Orman, 2015), since the empirical study of Rajan and Zingales (1995). However, this study includes other variables that have been investigated in capital structure research, such as firm growth, age, liquidity and business risk.

There has been controversy in the capital structure literature on the measurement of the independent variables. While there is a consensus in the measurement of certain variables such as asset tangibility, other explanatory variables have been measured differently for many reasons such as data availability, accounting standards used in the country of study and issues around multicollinearity. In this section, the study shows how the independent variables will be measured and provides justification for the chosen measurement approach. Generally, it is important to point out that the method used in measurement will be based on its benefit to this study and its suitability in the context of this research.

Profitability: The prediction of different theories about the relationship between leverage and profitability is contradictory. While the trade-off theory suggests that profitability will lead to more borrowing, the pecking order theory argues for a negative relationship and has found more empirical support (Rajan and Zingales, 1995, Zaheer, 2011, Črnigoj and Mramor, 2009). Qiu and La (2010) used the ratio of EBIT to total asset market value in measuring profitability. However, due to the unreliability of measures based on market value, studies measured profitability against book value (Nagano, 2003, Chen, 2004, Ramlall, 2009, Handoo and Sharma, 2014). Chen (2004), for instance, measured profitability using the ratio of earnings before interest depreciation and amortisation (EBITDA) to total assets. This study uses the ratio of annual operating profit to total assets in measuring profitability in line with previous empirical literature (Titman and Wessels, 1988b, Fama and French, 2002a, Psillaki and Daskalakis, 2009, Aviral and Raveesh, 2015).

Asset tangibility: Various measures have been used for tangibility by previous literature. Chen (2004) added inventories in his measurement of tangible assets. Other research used the market value of total assets as a denominator in their measurement (Qiu and La, 2010). This study favours the measurement in terms of assets because the larger the fixed assets to total assets ratio of a firm, the higher the likelihood of gaining external debt finance using those tangible assets as a collateral. However, intangible fixed assets are not considered by the current study because they are more illiquid, more firm-specific and their values are difficult to estimate (Campello and Giambona, 2010). Inventories are also excluded since they are short-term assets which do not qualify as collateral. Thus, tangibility is measured as a ratio of fixed asset to total assets (FA/TA) similar to prior studies (Titman and Wessels, 1988b, Strýčková, 2015, Nejad and Wasiuzzaman, 2015).

Firm Size: In the measurement of firm size, the majority of previous studies use measures based on assets (Wald, 1999, Chen, 2004, Cassar and Holmes, 2003, Akhtar, 2005). Other studies used measures relating to sales (Brav, 2009; La Rocca et al., 2011). However, to avoid multicollinearity, this study will not measure firm size based on assets since the independent variables (short-term and long-term debt) used in this study are already measured in terms of total assets. Thus, firm size was measured as the natural logarithm of sales in line with previous empirical studies (Ahmed Sheikh and Wang, 2011, Kühnhausen and Stieber, 2014, Daszynska-Zygadlo et al., 2012, Köksal and Orman, 2014). In this study the log of total sales was used, since natural logarithm enables the appreciation of consistent changes over time.

Firm growth: Due to lack of consensus on how firm growth is to be measured, previous empirical literature has used several indicators of firm growth in its measurement. In this study, firm growth is measured as the percentage change in revenue over the study period. This enables an understanding of how the firm has performed over these years in terms of its revenue expressed in percentage terms. Several studies on capital structure have measured growth in terms of increase in revenue (Rajan and Zingales, 1995, Bevan and Danbolt, 2002).

Firm age: Firm age was measured in line with the majority of empirical studies by counting the time from firms' initial registration to the end of the tax year (Michaelas et al., 1999, Abor and Biekpe, 2009, Bassey et al., 2014). This is given in years.

Business risk: Several empirical studies on capital structure have measured risk using either earnings volatility, stock return volatility or that of operating income (Titman and Wessels, 1988b, Deesomsak et al., 2004, Welch, 2004). The most important factor in the measurement of firms' business risk is the extent of volatility of its income since this influences the firms' ability to make a prompt payment of interest charges (Ferri and Jones, 1979, Brailsford et al., 2002). In line with Wald (1999), this study will measure business risk using the standard deviation of yearly percentage change in firms' operating income before payment of interest, taxes and depreciation over total assets.

Liquidity: Prior studies use firms' current ratio as proxy for liquidity since the ratio shows firms' ability to meet their current obligation (Graham, 2000, Ozkan, 2001, Deesomsak et al., 2004). In line with these studies, liquidity is measured in this study as the ratio of current assets to current liabilities.

Table 4.3: Measurement of variables

Dependent variables	**Definition**	**Measurement**
St Lev	Short-term debt	Short-term debt over total assets
Lt Lev	Long-term debt	Long-term debt over total assets
Tot Lev	Total debt	Total debt over total assets
Independent variables	**Definition**	**Measurement**
Prft	Profitability	The ratio of operating profit to total assets' book value.
Astang	Asset Tangibility	The ratio of fixed assets to total assets
Sz	Size	Natural log of sales
Gwt	Firm Growth	Percentage change in revenues
Age	Age	Number of years of existence in business
Rsk	Risk	Standard deviation of return on assets over the period
Liquid	Liquidity	Current assets divided by current liabilities.

4.4 Justification of Book Value Measurement

Several empirical studies have defined the leverage ratio based on book value (Alzomaia, 2014, Abor and Biekpe, 2006, Bassey et al., 2014, Shyam-Sunder and Myers, 1999, Michaelas et al., 1999, Ahmed Sheikh and Wang, 2011, Daszynska-Zygadlo et al., 2012, Chen, 2004, Shah et al., 2004, Anwar, 2013), while others have used both the book and market value (Bevan and Danbolt, 2002, Belkhir et al., 2016) or employed market value as a denominator in their leverage measures (Faulkender and Petersen, 2006, Fan et al., 2012, Qiu and La, 2010).

One major disadvantage of using market value of debt is that it may be affected by the market volatility which affects the accuracy of the regression results (Mukherjee and Mahakud, 2012, Alzomaia, 2014). Titman and Wessels (1988b) argue that the differences between the book and

market value are unlikely to have any impact on the capital structure determinants. Similarly, Bowman (1980) insists that the estimation of debt's market value is not necessary since the difference between those measures of debt is not large.

The major reason for using book value of debt in this research, instead of market value, is that changes in debt market value are beyond managerial control and, thus, not a product of firms' discretion (Mukherjee and Mahakud, 2012, Taggart, 1977, Baskin, 1989, Marsh, 1982). Ethridge and Corbin (1996) argue that measurement based on debt book values are more reliable and have a considerable degree of relevance for the user of financial statements.

Similarly, Myers (1977) argues that using the book value will be a more realistic option in the capital structure measurement since it involves the asset value in place instead of capitalised future value. Furthermore, Banerjee et al. (1999) explained that calculations of a firm's tax shield and the debt holder's liability in the event of bankruptcy is based on debt book value. Thus, the current study considered only book value in its measurement, as opposed to the market leverage, due to the volatility of the (Nigerian) stock market as at this period.

4.5 Empirical procedures of data Analysis

This section discusses the preliminary analysis, the multivariate analysis and the robustness test employed.

4.5.1. Preliminary Analysis

The majority of prior studies use descriptive statistics, multivariate analysis and the correlation matrix in their preliminary data analysis. The purpose of descriptive statistics is to ensure an appropriate summary of data.

The current study also employed the variance inflation factor (VIF) and pairwise correlation matrix to test for multicollinearity among two or more explanatory variables with correlation coefficients ranging from +1 (strong linear relationship) to -1 (no linear relationship). Prior studies suggest that

when the level of correlation among independent variables is high (above 80%), there will be a negative impact on the regression results (Grewal et al., 2004, Gujarati and Porter, 2011).

4.5.2. Multivariate Analysis

The current study will employ the two-step GMM system in its dynamic capital structure estimation. Autocorrelations will be tested using Arellano and Bond (1991) test of autocorrelation (AR1 and AR2). While autocorrelation is expected in the first test (AR1), the robustness of the study result will be determined by the absence of autocorrelation in the second test (AR2). Furthermore, this study will test the validity of the study's instruments using the Sargan test.

4.5.2.1 Econometric Techniques

Various econometric techniques have been employed by previous literature. This study uses GMM as a method of estimation of capital structure determinants and the speed of adjustment among Nigerian non-financial firms. Other econometric techniques, such as OLS regression, panel data techniques, specifically fixed effect and the random effect, will be discussed to show why GMM is more suitable to achieve the study's aim.

4.5.2.1.1 OLS Regression

OLS regression has been employed by previous capital structure studies (Ozkan, 2001, Ahmed Sheikh and Wang, 2011). However, OLS regression may not be consistent if used in the present study due to the possibility of the correlation of the unobservable firm effect with the lagged value of the dependent variable, y_{t-1} (Bond, 2002). While this correlation could be avoided through first-differencing, this still makes OLS inefficient as the change in the error term and that of the lagged dependent variable will be correlated. Furthermore, the assumption of the OLS estimator is based on the strict exogenous independent variables which are unlikely in the capital structure decision (Antoniou et al., 2008). Ozkan (2001) documents strong evidence showing the upward bias of the lagged dependent variable under OLS. The author estimation under OLS is 0.78 and is much higher than the GMM result of 0.59.

4.5.2.1.2 Panel Data Econometrics

Panel data estimation is also applied by previous studies (De Miguel and Pindado, 2001, Ozkan, 2001, Maçãs Nunes and Serrasqueiro, 2007). Panel data consists of both cross sectional and time dimensions (Hsiao, 2014, Greene, 2002). The cross-sectional data simply implies that multiple individuals (firms) are observed at the same point in time, while the time series data enables the observation of a single individual at many different times. Thus, using panel data allows observation of firms at a particular period and also the study of each firm in the sample in each different year. The importance of panel data is that it investigates causes of changes both on individual and on cross-section observations over time. Furthermore, the panel data model increases the degree of freedom (Gujarati, 2003b, Gaud et al., 2005, Antoniou et al., 2008, Gujarati and Porter, 2011). According to Serrasqueiro and Nunes (2008), the advantage of panel data techniques is their suitability for measuring those individual effects that are unobservable.

4.5.2.1.2.1 Fixed Effects

The fixed effect accounts for the heterogeneity among those firms in the study sample. In the fixed effect regression, each company has its own intercept. The fixed effect allows the unobserved heterogeneity (denoted by α_i) to be correlated with the estimator variables $E(\alpha_i / X_{it} Z_i) \neq 0$. The model is generally stated as follow:

$$\boldsymbol{Y_{it} = \beta_1 X_{it} + \alpha_i + u_{it}} \qquad \textit{(eq. 1)}$$

Where α_i (I = 1…n) is used as each entities' specific intercept (fixed effect); Y_{it} is the dependent variable, (where i= entity and t= time); X_{it} represents the independent variable; β_1 the coefficient of the independent variable and μ_{it} is the error term. However, the fixed effect understates the regression coefficient (Aybar-Arias et al., 2012) and necessitates a separate endogeneity and heteroscedasticity test.

4.5.2.1.2.2 The Random Effects Model

The random effects model, unlike the fixed effects model, assumes that the individual specific effects are not correlated with the independent variables used since they are meant to be random (Green, 2008). Thus, the random effect leaves out those variables that control for unobserved heterogeneity since this is not assumed in the model. It does so through the combination of both the α_i and the ε_{it} to create a new error term. The advantage of the random effect is that its standard error is less when compared to those of the fixed effect model and it also allows for time constant, unlike the fixed effects model. The random effects model is stated as follows:

$$\boldsymbol{y_{it} = \alpha + X_{it}\beta + u_i + \varepsilon_{i,t}} \qquad \textit{(eq. 2)}$$

The random effect model is most times inconsistent if the unobserved heterogeneity is correlated with α_i i.e. if, $Cov(\alpha_i, X_{it} \neq 0)$.

4.5.2.1.3 Dynamic Model

In a dynamic model, the cost of adjustment to firms' target debt level determines the adjustment behaviour. Prior studies argue that, given adjustment costs, firms are likely to adjust when the cost of deviation from the target is greater than the cost of adjustment (Abdeljawad et al., 2017, Van Hoang et al., 2017). Dynamic models use the lagged value of the dependent variable(y_{t-1}) as the independent variable in the regression.

Unlike OLS, where exogeneity is assumed (Aybar-Arias et al., 2012), dynamic panel data is generally used if the explanatory variables are not completely exogenous, meaning that there is a possibility of correlation with both past values and error terms. To avoid an endogeneity problem, the dynamic model employs instrumental variables. This satisfies the validity criteria, meaning that the instrument is uncorrelated with the error term. The consistency of the instrumental variables used in a dynamic model depends on the validity of the instruments. For instance, the instruments

are weak if they have only marginal relevance (Bond, 2002). In this case, the consistency of the estimator may still be maintained, but may approximate actual sampling distribution poorly. Thus, it is important to identify appropriate instruments.

Hansen (1982) developed the generalised method of moments (GMM), alongside the Holtz-Eakin et al. (1988) version of GMM which makes use of first differencing. Similarly to the GMM estimator of Arellano and Bond (1991), it offers a better framework for ensuring asymptotically efficiency estimation due to its ability to control for individual heterogeneity. This GMM difference is also popular due to its ability to employ instrumental variables in mitigating endogeneity problems and offering an advantage over the two-stage least square technique (2SLS) of Anderson and Hsiao (1982).

However, Antoniou et al. (2008) show that the estimators of differenced GMM suffer from weak instruments, which leads to poor finite sample properties. For instance, for subsequent first differences given short periods, large cross-sections and the persistency of time series, the lagged-level have higher chances of producing weak instruments (Blundell and Bond, 1998) resulting in imprecise or even biased estimations.

The GMM systems estimator of Arellano and Bover (1995) and (Blundell and Bond, 1998), which uses two simultaneous equations both in the level and in the first differences, was suggested as a better estimator than that of Arellano and Bond (1991) because it instruments both first differences equation and the level equation (Aybar-Arias et al., 2012). It employs lags of endogenous variables and the differenced variables. Due to its use of more moment conditions, the GMM system's finite sample bias is reduced and its efficiency improved, even when there are weak instruments. Consequently, many capital structure studies have employed the GMM system in their dynamic capital structure estimation (Clark et al., 2008, Lemmon et al., 2008, Abdeljawad et al., 2017).

The current study employed the two-step GMM system estimator since it eliminates the potential endogeneity problem, and is not based on conditions of normality and heteroscedasticity for its assumptions to be fulfilled (Antoniou et al., 2008).

GMM estimators are expected to have the first order autocorrelation but the second order correlation will violate its consistency because it shows some lags as invalid instruments. This study will report second order autocorrelation to ensure the validity of the model. Furthermore, the model requires an exogenous instrument to satisfy its validity criteria. This study will use the Sargan test to examine whether the instruments are exogenous. Finally, the Wald test is used in this study to show whether the model is suitable for the data.

The dynamic model is stated as follows:

$$\boldsymbol{y_t = f(y_{t-1}, x_1, x_2, \ldots \varepsilon_t, \varepsilon_t \sim IID(0, \sigma^2)} \qquad \textit{(eq. 3)}$$

The dynamic model is estimable on an individual level as follows.

$$\boldsymbol{\Delta y_t = \emptyset_0 \, \Delta x_t - (1-\lambda)[y_{t-1} - \alpha - \beta x_{t-1}]} \qquad \textit{(eq. 4)}$$

In this equation (eq. 4), the adjustment parameter is (1-λ) and is used when measuring the adjustment speed. x_t is a random variable that is not correlated with the error term. The model employed in this study is stated as follows:

$$\boldsymbol{Y_t - Y_{t\_1} = \lambda (Y_t^* - Y_{t\_1})} \qquad \textit{(eq. 5)}$$

λ is less than one but is greater than zero, (1 > λ > 0) but is expected to be one (λ =1) in a frictionless world, when full adjustment is assumed. However, if no adjustment occurs, the λ will be equal to zero. Prior studies argue that firms adjust slowly towards optimal leverage (Basu, 2015, Tao et al., 2017a). Unlike in the static model, this adjustment is not immediate and requires the knowledge of the target ratio (Y_t^*) which differs from the firms' debt ratio of the current year (Yt). The target leverage is unobservable (Hovakimian et al., 2001, Drobetz and Wanzenried, 2006, Ramjee and

Gwatidzo, 2012), varies across firms and years (Abdeljawad et al., 2017) and depends on other firm characteristics.

Depending on the target ratios, the deviation from leverage target may be either positive or negative. If this is not the case, it will be assumed that the optimal leverage is a poor target or non-existent giving a statistically insignificant result and a coefficient which is the same as zero. In line with the prior studies (Shyam-Sunder and Myers, 1999, Nunes and Serrasqueiro, 2017), the current study argues that target leverage depends on firm characteristics. Thus, the current study includes various firm characteristics and the lagged dependent variable to determine the adjustment speed. Thus, in examining the optimal level of short-term and long-term debt, the following model is employed;

$$\mathbf{Ltlev_{i,t}} = \boldsymbol{\lambda}\mathbf{Ltlev_{i,t-1}} + \sum_{K=1}^{n} \boldsymbol{B_K Z_{K,i,t}} + \boldsymbol{\mu_i} + \boldsymbol{\nu_{i,t}} \qquad \textbf{(eq.6)}$$

$$\mathbf{Stlev_{i,t}} = \boldsymbol{\lambda}\mathbf{Stlev_{i,t-1}} + \sum_{K=1}^{n} \boldsymbol{B_K Z_{K,i,t}} + \boldsymbol{\mu_i} + \boldsymbol{\nu_{i,t}} \qquad \textbf{(eq. 7)}$$

Where; $\text{Stlev}_{i,t}$ is the short-term leverage of firm i in period t; $\text{Ltlev}_{i,t}$ is the long-term debt of firm i in period t. $\text{Stlev}_{i,t-1}$ is the short-term debt of firm i in period t_1; $\text{Ltlev}_{i,t-1}$ is the long-term debt of firm i in period t_1; $\text{Stlev}^{*}_{i,t}$ and $\text{Ltlev}^{*}_{i,t}$ is the respective optimal short-term and long-term debt of firm i in period t. λ is the speed of adjustment of actual level of short and long-term debt towards target short-term debt and long-term debt ratio. $Z_{K,i,t}$ are the determinants (K) of both long-term and short-term leverage of firm i in period t (Profitability, asset tangibility, size, firm growth, age, business risk, liquidity), μ_i is the unobservable firm specific effect, while $\nu_{i,t}$ represents the error term.

The dynamic model used in this study ensures correct estimation of how long-term and short-term leverage adjust towards target leverage. Arellano and Bond (1991) state that using the dynamic panel model will lead to endogeneity control and elimination of collinearity between explanatory variables. It will also ensure that problems emanating from omitted variables are avoided.

4.6 Further Analysis and Robustness Check

For the purpose of confirming the robustness of the study's main result, further analysis will be conducted based on the level of indebtedness and on the size of the firm.

4.6.1 Analysis Based On Degree of Indebtedness

Prior studies have found that the level of debt in a firm (whether a firm has high or low leverage) may influence both the capital structure determinants and the speed of adjustment (Lemmon et al., 2008, Abdeljawad et al., 2017). To test this assumption, the main study sample will be sub-divided using median leverage to show firms with high leverage and those that have a low leverage level. Each of these samples will be separately re-estimated to test the adjustment speed and the relevance of the study's independent variables (their significance) in explaining capital structure.

4.6.2 Analysis Based On Firm Size

The second robustness test will be based on firm size. The median value of the firms' total assets was used to split the whole study sample into two (larger firms and smaller firms) and the study's equation re-estimated. This is important since prior literature has suggested the impact of size on firms' capital structure choice (Titman and Wessels, 1988b, Bevan and Danbolt, 2002, Chen, 2004, Deesomsak et al., 2004, Abor and Biekpe, 2009) and their adjustment speed to target leverage (Byoun, 2008, Castro et al., 2014). Larger firms are assumed to be more diversified (Rajan and Zingales, 1995), which ensures the stability of their cash flow (Titman and Wessels, 1988b), reduces volatility of their earning (Fama and French, 2002b) and their risk of bankruptcy. Consequently, this study tests the implication of size on both long-term and short-term leverage and the overall adjustment process (including the SOA).

4.6.3 Analysis Based on Firms' Industry

Prior literature suggests that firms' industrial affiliation may have an impact on their capital structure decision (DeAngelo and Masulis, 1980, Masulis, 1983, Harris and Raviv, 1991, Frank and

Goyal, 2009, MacKay and Phillips, 2005). Frank and Goyal (2009) used industry to represent certain omitted factors which are similar to all firms in their study. This study will examine the capital structure decision across different industries. The study sample will be divided based on industry and the equation re-estimated to find out whether the result would be similar to the main result in table 5.4.

4.7. Summary

The current study examines the capital structure determinants and speed of adjustment among Nigerian non- financial firms for the period 2001 to 2015. Unlike most empirical studies, firms that applied static framework using the observed leverage ratio as a proxy for the optimal leverage ratio (Titman and Wessels, 1988b, Rajan and Zingales, 1995, Chittenden et al., 1996, Ahmed Sheikh and Wang, 2011), the current study employs a dynamic model in examining whether there is a target leverage ratio among Nigerian non-financial firms.

The dependent variable used in this study is long-term and short-term leverage, since Bevan and Danbolt (2002) found that the relationship between leverage and firm characteristics is dependent on the leverage component (whether short-term or long-term leverage) analysed.

On the measurement of dependent variables, Rajan and Zingales (1995) suggest that the objective of the analysis will determine the measures used. Consequently, both long-term and short-term leverages were scaled against total assets in line with the majority of empirical studies (Michaelas et al., 1999, Pandey, 2001, Chen, 2004, Bas, 2012).

Since Fischer et al. (1989) considered cost of adjustment in their dynamic leverage model, many studies have examined the firm characteristics that affect target leverage (Ozkan, 2001, Clark et al., 2008, Castro et al., 2014, Getzmann et al., 2014, Mangafić and Martinović, 2015, Zhou et al., 2016b, Abdeljawad et al., 2017). Following prior studies, this study employed firm characteristics

(profitability asset tangibility, size, growth, age, risk and liquidity) as determinants of capital structure.

The current study uses the book value measurement for both dependent and independent variables in line with previous literature (Alzomaia, 2014, Abor and Biekpe, 2006, Bassey et al., 2014, Shyam-Sunder and Myers, 1999, Michaelas et al., 1999, Ahmed Sheikh and Wang, 2011, Daszynska-Zygadlo et al., 2012, Chen, 2004, Shah et al., 2004, Anwar, 2013). Furthermore, book value measures are considered in this study, as opposed to the market leverage, due to the volatility of the (Nigerian) stock market at this period, which makes it important to use more reliable measures (book value) of debt as a result of the unavailability of market data. To avoid multicollinearity, different measures (not based on total assets) were used for some of the study's explanatory variables.

The GMM system estimator of Arellano and Bover (1995) and (Blundell and Bond, 1998) is also employed. Similarly to the study of (Ozkan, 2001), both the Wald and Sargan tests are employed in testing the suitability of the model and the validity of the instrument respectively.

Chapter Five: Determinants of Capital Structure: Results and Discussions

5.1 Introduction

Prior studies suggest that firm specific characteristics will determine firms' target leverage (Ozkan, 2001, Castro et al., 2014, Mangafić and Martinović, 2015, Abdeljawad et al., 2017). Thus, the current study examines firm level factors that determine long-term and short-term leverage among listed non-financial firms in Nigeria. In this study, the distinction was made between these types of leverage since each differs in terms of maturity, contingencies of pay out, interest rate concession and the priority in the face of bankruptcy (Michaelas et al., 1999, Berglöf and Von Thadden, 1994).

5.2 Descriptive Statistics

In table 5.1, the current study's total observations, the minimum, maximum, mean and the standard deviation are presented. The current study uses the book value of the dependent variable and they are all scaled by total assets. From the descriptive statistics, the minimum values of long-term leverage and short-term leverage are 0.08 and 0.00 respectively, while 0.70 and 0.29 are their respective maximum values. The standard deviation of long-term leverage (0.06) and short-term leverage (0.05) show that both have a similar rate of dispersion. Furthermore, the mean values of long-term and short-term leverage are 0.17 and 0.05 respectively, which implies that long-term leverage is, on average, more than three times larger than the short-term leverage. This may be due to the cost of short-term finance. The descriptive statistics also show that the total number of observations used for the current study is 1905, which is large enough for the purpose of the current study and ensures generalisability of the study findings.

With respect to the current study's independent variables, profitability values show some level of dispersion since they range from -0.022 to 0.19. Asset tangibility has a standard deviation of 10 with a very low (0.00) minimum value and a maximum value of 0.93. From table 5.1, it is

evident that the mean value of firm size is 6.44, with 3.54 and 8.99 as its respective minimum and maximum values. For firm growth, a minimum value of -0.48 and a maximum value of 3.87 are reported in table 5.1; its standard deviation of 0.15 shows a high degree of dispersion.

The average age of firms in the study sample is 37 years with a minimum age of 1 year and a maximum of 116 years, which justifies the inclusion of age as a dependent variable in this study. Furthermore, the respective minimum and maximum (0.03 and 41.42) values of business risk variable, with its standard deviation of 5.09, show a varying risk level among firms in the study sample. Liquidity has a minimum value of 0.03 and a maximum value of 8.35 showing also a very significant variation in the liquidity level among Nigerian non-financial firms.

Table 5.2 also shows the yearly mean figures for long-term and short-term leverage. This yearly analysis shows that the minimum mean of long-term and short-term leverage between 2001 and 2015 is 14.7% and 5.6% and the maximum value is 18.4% and 7.9% respectively. Overall, the low leverage level among Nigerian firms may be due to capital market reform in Nigeria, especially the forced capitalisation of Nigerian commercial banks (since 2005), leading to their dominance in the Nigerian stock exchange. This is also linked to the increasing importance of equity finance among Nigerian firms. However, the lowest figure of short-term leverage is between 2007 and 2010, and may be due to the effect of the financial crisis.

Table 5.1 Descriptive Statistics of Dependent and Independent Variables

Variable	Observation	Mean	Sd.	Min	Max
DEPENDENT VARIABLES					
Long-term Leverage BV (%) (LTD)	**1905**	**0.17**	**0.06**	**0.08**	**0.70**
Short-term Debt (%) (STD)	**1905**	**0.05**	**0.05**	**0.00**	**0.29**
INDEPENDENT VARIABLES					
Profitability (%) (PROF)	**1905**	**0.02**	**0.03**	**-0.22**	**0.19**
Asset Tangibility (%) (ASTANG)	**1905**	**0.02**	**0.10**	**0.00**	**0.93**
Firm Size (%) (SIZE)	**1905**	**6.44**	**0.88**	**3.54**	**8.99**
Firm Growth (%) (GROWTH)	**1905**	**0.03**	**0.15**	**-.48**	**3.87**
Firm Age (AGE)	**1905**	**37**	**20.0**	**1**	**116**
Business Risk (RSK)	**1905**	**5.38**	**5.09**	**.03**	**41.42**
Liquidity (LIQUID)	**1905**	**1.32**	**1.29**	**.03**	**8.35**

In **Table 5.2,** the total number of observations, the minimum (min), the maximum (max), the mean and the standard deviation (sd) of the study variables are provided**. LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book value.

Table 5.2: Mean Yearly Leverage

Year	MEAN	
	LTLEV	STLEV
2001	14.8%	7.9%
2002	14.9%	8.7%
2003	14.7%	7.3%
2004	14.9%	6.9%
2005	14.8%	6.5%
2006	14.7%	7.4%
2007	17.9%	5.6%
2008	16.9%	5.2%
2009	15.7%	5.6%
2010	18.4%	5.6%
2011	17.2%	6.7%
2012	14.9%	6.3%
2013	14.8%	6.2%
2014	15.1%	5.9%
2015	18.1%	6.7%

Note: **LTLEV** = Long-term leverage and is measured as long-term debt over total assets; **STLEV** = Short-term leverage and is measured as short-term debt over total assets.

5.3. Multicollinearity

Multicollinearity occurs among independent variables when there is a high level (± 80%.) of association between two or more independent variables, thereby increasing the problem of distinguishing the effect of the study's variables involved (Murray, 2005). The correlation coefficient matrix or variance inflation factor (VIF), which are the two main techniques used in detecting multicollinearity among independent variables, are employed in the current study.

Although there is still controversy with regards to the cut-off point for multicollinearity detection, studies (e.g. Gujarati, 2003a, Grewal et al., 2004, Harris and Raviv, 2008, Gujarati and Porter, 2011) argue that the cut-off for severe multicollinearity, which may harm the result of the regression, will be as from 80%. For VIF, Craney and Surles (2002), argue for multicollinearity when the VIF value is equal or greater than 10.

In table 5.3 A, which is based on the correlation coefficient matrix, the highest correlation (Coef = 0.1239) shown is between asset tangibility and firm risk. Furthermore, table 5.3B shows very low VIF (the mean value = 1.04), meaning that the multicollinearity issue does not exist among the dependent variables used in the current study.

TABLE 5.3A CORRELATION MATRIX

	LTLEV	STLEV	PROF	ASTANG	SIZE	GROWTH	AGE	RISK	LIQUID
LTLEV	**1.0000**								
STLEV	**0.3953**	**1.0000**							
PROF	**-0.0799**	**-0.0946**	**1.0000**						
ASTANG	**0.3673**	**0.2413**	**-0.0748**	**1.0000**					
SIZE	**0.0558**	**0.1860**	**0.1176**	**-0.0894**	**1.0000**				
GROWTH	**0.1003**	**0.0536**	**-0.0331**	**0.1004**	**-0.0671**	**1.0000**			
AGE	**0.0207**	**0.1245**	**-0.0221**	**0.0572**	**0.1363**	**-0.0111**	**1.0000**		
RISK	**-0.0233**	**0.0640**	**-0.0896**	**0.1239**	**-0.2168**	**0.1126**	**-0.0346**	**1.0000**	
LIQUID	**-0.0221**	**0.0238**	**-0.0005**	**-0.0262**	**-0.0445**	**0.0193**	**-0.0319**	**-0.0231**	**1.0000**

LTLEV = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book value. **ASTANG** = Asset tangibility, measured as **the** ratio of fixed assets to total assets. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk, measured as the standard deviation of return on assets. **LIQUID** = Liquidity, measured as the ratio of current assets to current liability**.**

TABLE 5.3B VIF COLLINEARITY TEST RESULTS		
Variable	**VIF**	**1/VIF**
PROF	1.02	0.977116
ASTANG	1.04	0.964892
SIZE	1.09	0.918582
GROWTH	1.02	0.977116
AGE	1.03	0.974571
RISK	1.08	0.929797
LIQUID	1.00	0.995089
MEAN VIF		**1.04**

5.4. Multivariate Analysis

In order to examine the current study's hypotheses, the GMM system estimator of Arellano and Bover (1995) and Blundell and Bond (1998) is employed. Several tests, such as the autocorrelation test ,Wald test and Sargan test used by previous studies (Ozkan, 2001, Drobetz and Wanzenried, 2006), are also employed in the current study to ensure the validity of the study findings.

For the autocorrelation test, Bond (2002) emphasised that GMM estimators are expected to show the first order autocorrelation (which is significant), but the second order correlation will violate its consistency because some lags may be shown as an invalid instrument. The result (see table 5.4) of a second order autocorrelation test for total leverage (0.9105), long-term leverage (AR2 = 0.3348) and short-term leverage (AR2 = 0.8916) shows that there is no autocorrelation problem that may harm the result of this study.

Furthermore, the results of the Sargan test for total leverage (P-Value = 0.3186), long-term leverage (P-Value = 0.1469) and short-term leverage (P-Value = 0.3805) show that the instruments are

exogenous, meaning that the instruments used in the current study are valid. Finally, the Wald test was used in this study to examine the suitability of the current study's model. The results of the Wald test for both dependent variables are significant at the 1 percent level, showing also that the regressors have joint significance in the estimation of the dependent variables used in the current study.

The dependent variable used in this estimation are total, long-term (ltlev) and short-term leverage (stlev). Bevan and Danbolt (2002) found variation in leverage determinants based on the leverage component being analysed. The current study also used total leverage to measure the adjustment speed among Nigerian non-financial firms. The results in table 5.4 report both the estimates for long-term and short-term leverage. In order to compare the determinants of both types of leverage, both estimates are place side by side in table 5.4. In line with previous studies, the current study found that profitability asset tangibility, size, growth, age, risk and liquidity are the determinants of optimal leverage.

5.4.1 Determinants of Capital Structure

In table 5.4, panel A shows a positive and significant relationship between profitability and long-term leverage (Coef. = .01173, $p < 0.000$) and supports the trade-off theory, which argues that tax deductibility of interest expense and a lower default risk will result in higher debt ratios among profitable firms (Kraus and Litzenberger, 1973, Scott Jr, 1976). However, this result is contrary to the current study's hypothesis (**H1b**), which predicts a negative and significant relationship between profitability and long-term leverage. A similar result is reported by Michaelas et al. (1999). Based on agency theoretical consideration (the agency theory of free cash flow) , this positive relationship between profitability and leverage may be justifiable if the intention of these firms is to discipline their managers through debt and to limit their perquisite consumption (Jensen, 1986, Stulz, 1990). This result may also be explained by the relative costliness of short-term leverage when compared to long-term leverage. Since long-term debt is relatively cheaper, although difficult to acquire from

lenders (mainly Nigerian commercial banks), firms' profitability may not lead to its decrease but enable the firms to convince lenders of their ability to afford of this type of finance.

In line with the pecking order theory, a negative and a highly significant relationship between profitability and short-term leverage (Coef. = -.0817712, $p < 0.000$) was also reported in table 5.4. The pecking order theory generally argues that external finance should only be considered when there is insufficiency or unavailability of retained earnings. According to the theory's hierarchy of financing, retained earnings should be used first, since they are free from asymmetric information (Myers and Majluf, 1984). The study result is in line with the hypotheses **H1** and **H1a** of the current study. This negative correlation (**H1a**) is expected, since the cost of short-term finance is likely to make firms rely on internally generated funds.

A similar negative and significant relationship was found between profitability and total leverage (Coef. = -0.07265, $p < 0.000$) and points to the dominance of pecking order behaviour among Nigerian non-financial firms. The majority of prior studies have documented a negative and significant relationship between leverage and profitability, which shows that profitable firms are generally not interested in debt (Titman and Wessels, 1988a, Harris and Raviv, 1991, Rajan and Zingales, 1995, Booth et al., 2001a, Fama and French, 2002b, Gaud et al., 2005, Degryse et al., 2009, Ahmed Sheikh and Wang, 2011, Toy et al., 1974, Kester, 1986).

In the case of the listed non-financial firms in Nigeria, another possible explanation of the negative relationship between profitability, short-term leverage and total leverage is that these firms may show more preference for equity rather than debt. This is due to the forced capitalisation policy of the central bank of Nigeria, which led to fierce competition with financial firms in the capital market.

Asset tangibility (Astang) has a positive and significant relationship with both total, short-term and long-term leverage and confirms the current study's hypotheses (**H2, H2b**) which predict a positive and significant relationship between tangibility and leverage. Nevertheless, the negative relationship expected for short-term leverage (**H2a**), contradicts the study result. It is assumed in the hypothesis development that, due to the role of asset tangibility in increasing long-term leverage, it will have a negative relationship with short-term leverage.

The positive and significant relationship between tangibility the dependent variables means that Nigerian firms need tangible assets to obtain long-term debt and short-term bank loans. Although this result is interpreted in favour of the trade-off theory, it does not contradict the pecking order theory, which puts debt in the second pecking order of finance. This also confirms why both theories are considered as not mutually exclusive and should not be involved in an empirical horse race (Fama and French, 2002a, Cotei and Farhat, 2009, Mukherjee and Mahakud, 2012).

It is important to emphasise that, in such an environment of developing countries, marked by weaker laws and investors' protection (Fan et al., 2012), tangibility of firms' assets will be very important in securing both long-term and short-term loans. This is because tangibility of assets reduces the information gap between borrowers and lenders (Myers and Majluf, 1984, Harris and Raviv, 1991), helps lenders in overcoming the problem of moral hazard (Di Patti and Dell'Ariccia, 2004) and thus reduces the overall cost of lending (Titman and Wessels, 1988b, Mackie Mason, 1990, Psillaki and Daskalakis, 2009, Vătavu, 2012, Öztekin, 2015).

This result is also consistent with empirical results in both developed (Titman and Wessels, 1988b, Rajan and Zingales, 1995, Michaelas et al., 1999, Bevan and Danbolt, 2000, Strýčková, 2015, Berkman et al., 2016) and developing countries (Booth et al., 2001b, Abor and Biekpe, 2009, Eldomiaty, 2008, Köksal and Orman, 2014, Lemma and Negash, 2014). For instance, Fan et al.

(2012) found a positive and significant relationship between leverage and asset tangibility in 38 out of 39 countries studied.

With regards to firm size, the result shows a negative and significant relationship with the long-term and short-term leverage (Coef. = -.00043, $p < 0.000$; Coef. = -.0014555 , $p < 0.000$) and thus fail to confirm the current study's hypotheses for total leverage and long-term leverage (**H3, H3b**), which predict a positive and significant relationship with leverage in accordance with the prediction of the trade-off theory. This relationship was predicted since firm size directly influences the issuance cost of both firms' equity and debt (Titman and Wessels, 1988b, Bevan and Danbolt, 2002, Chen, 2004, Deesomsak et al., 2004, Abor and Biekpe, 2009). For short-term leverage, the current study's result is similar to the proposed relationship (**H3a**).

This result is expected since firm size influences its ability to obtain more attractive short-term debt. Furthermore, a negative and significant relationship between size and total leverage (Coef. = -0.001250, $p < 0.000$) is a further sign that, as the size increases, the attractiveness of leverage reduces among these Nigerian firms in the study sample.

This result contradicts several empirical findings that show a positive relationship between size and leverage (Titman and Wessels, 1988b, Bevan and Danbolt, 2002, Chen, 2004, Deesomsak et al., 2004, Abor and Biekpe, 2009). Rajan and Zingales (1995) suggested that firm size may act as inverse proxy for the level of asymmetric information between investors and managers. If this is the case, large Nigerian firms are expected to issue more equity rather than debt. Michaelas et al. (1999) and Chen (2004) document similar results.

Although the pecking order theory is not specific regarding how firm size is related to different types of leverage, studies in favour of pecking order support a negative association with all types of leverage (Fama and French, 2002b, Drobetz and Fix, 2003a, Köksal and Orman, 2015).

Firm growth is another variable, which points towards the pecking order theory. The study's result, presented in table 5.4, shows that firm growth has a positive and significant relationship with long-

term and short-term leverage (Coef. = 0.02531, p < 0.000; Coef. = 0.0051615, p < 0.000). Similarly, the positive relationship between growth and total leverage (Coef. = 0.030555, p < 0.000) is also a sign that the study results support the pecking order theory.

This result confirms the proposed relationship for both long-term and short-term leverage (**H4** and **H4a**) but fails to confirm the hypothesis for long-term leverage (H4b), where a negative and significant relationship between firm size and leverage is proposed. In the pecking order hierarchy of finance, debt is the more favourable means of finance after retained earnings (Myers, 1984, Myers and Majluf, 1984). Pecking order theory argues, therefore, that firms will issue debt to finance their growth, since retained earnings are mostly insufficient when a firm is growing. As seen in the descriptive statistics in table 5.3, the proportion of debt used by Nigerian non-financial firms in study samples are in no way comparable to that of equity and may help to explain the positive relationship between firm growth and both long-term and short-term leverage.

Regarding the firm age, the result reports a negative and significant association with total, long-term and short-term leverage (Coef. = -.00027, p < 0.000; Coef. = -0.00038, p < 0.000; Coef. = -0.0002102**,** p < 0.000), and is contrary to the current study's hypothesis for long-term leverage (**H5b**), which proposes that firm age will be positively and significantly related to long-term leverage in line with the findings of previous studies (Michaelas et al., 1999, Ramjee and Gwatidzo, 2012). Nevertheless, the result of the current study and the overall trend in the previous result supports the empirical results of Hussain and Nivorozhkin (1997), Johnsen and McMahon (2005) and Robb and Robinson (2012) who found that firm age is negatively related to leverage. Hussain and Nivorozhkin (1997) found that older firms' reputations may help them to raise equity finance in the stock market, which means a firm's reputation, acquired through age (long years of operation), may not necessarily be used in favour of debt as Diamond (1989) suggested.

Hussain and Nivorozhkin (1997) suggest that the negative relationship between age and long-term leverage may be due to the unwillingness of older firms to borrow at all costs, which is likely to be the case for Nigerian non-financial firms. The study result confirms the hypothesis (**H5a**) for short-term leverage in line with prior studies (Michaelas et al., 1999, Lemmon and Zender, 2001). This is because the availability of long-term finance may limit older firms' use of short-term leverage. The overall direction is further supported by the negative and significant relationship between age and total leverage (Coef. = -0.00027, $p < 0.000$). This negative relationship, between short-term, long-term and total leverage, is in support of the pecking order theory which suggests that firms' age reduces its dependence on debt. Some previous studies have reported similar results which show that the older and more mature a firm gets, the more its use of debt finance will be reduced (Hall et al., 2004, Klapper et al., 2006, La Rocca et al., 2011).

The study result also shows that business risk is positively and significantly related to short-term, long-term and total leverage (Kale et al., 1991) and contradicts the hypotheses H6, H6a and H6b, which proposed a negative relationship between business risk and all dependent variables. This result is surprising given the fact that Nigerian lenders are unlikely to finance a business they deemed risky. However, since Nigerian non-financial firms show less reliance on debt, there is a possibility of correlation between business risk and leverage.

Firms' liquidity ensures its ability to meet its current financial obligation (Sharma and Paul, 2015, Agliardi et al., 2016). The study result shows a negative and significant relationship between liquidity and long-term leverage (Coef. = -0.00534, $p < 0.000$). This is also supported by the reported negative association between liquidity and total leverage (Coef. = -.001079, $p < 0.000$). This negative relationship is in line with the pecking order theory, which suggests that firms with an internal source of funds (in this case, liquid assets) will only use debt when this fund is fully used up or insufficient. It is also consistent with the results of prior studies (Ozkan, 2001, Deesomsak et al., 2004, Frieder and Martell, 2006, Lipson and Mortal, 2009, Ahmed Sheikh and

Wang, 2011). This result confirms the hypotheses (**H7 and H7b**) of the current study, and is expected, since the liquidity of a firm's assets may lead to a lower cost of equity, thereby making equity issuance more likely than debt (Lipson and Mortal, 2009).

However, for short-term leverage, a positive and significant relationship between liquidity and leverage is reported, which is contrary to the current study's hypothesis (**H7a**) and implies that a firm's liquidity does not reduce its short-term leverage. This may be justifiable, since short-term debt is only about one third of total leverage of Nigerian firms, and is needed to boost firms' financing options in such an environment where firms' access to external finance is restricted due to an underdeveloped capital market.

This positive relationship also does not violate the pecking order assumption since short-term debt has lower asymmetric information (Myers, 1977, Myers, 1984, Myers and Majluf, 1984) and is thus preferred in the pecking order of finance before long-term debt and equity. Consequently, the whole result is interpreted in favour of the pecking order theory, since the coefficient sign of two independent variables are based on its prediction.

Although the presence of adjustment behaviour may suggest a support for the trade-off theory, the main result of the study shows that the behaviour of Nigerian firms is more in line with the pecking order theory. This is because the signs of the coefficient of most variables are as predicted by the theory. Similarly, Flannery and Rangan (2006) found in their study that pecking order consideration is partly responsible for variation in the target leverage.

Prior studies have argued that both pecking order and trade-off theories can complement each other (Shyam-Sunder and Myers, 1999, Barclay and Smith, 2005, Fama and French, 2005, Mukherjee and Mahakud, 2012). According to Shyam-Sunder and Myers (1999), the pecking order theory is not invalidated by a mere existence of target leverage adjustment behaviour among firms, while

Fama and French (2005) and Cotei and Farhat (2009) warned that it is inappropriate to engage both theories in an empirical horse race.

The overall result shows that Nigerian firms' profitability helps in reducing both their dependence on long-term and their short-term borrowing. It shows also that debt is increased if a firm is growing (see firm growth) and thus, in need of more funds. The most significant findings of this study is the importance of tangibility of firms' asset when acquiring long-term and short-term leverage.

Table 5.4: Relationship between Long-term and Short-term Leverage and firm-level characteristics (Dynamic Model)

PANEL A (GMM) **PANEL B (GMM)**

TOTLEV	Exp. Sign	Coefficient	Std. Error	LTLEV	Exp. Sign	Coefficient	Std. Error	STLEV	Exp. Sign	Coefficient	Std. Error
_Cons	+	**.154427**	**.000977**	_Cons	+	**.10967*** **	**.0007258**	_Cons	+	**.0542116*** **	**.0007822**
L1	+	**.370889**	**.00077**	L1	+	**.47066*** **	**.0002270**	L1	+	**.2091354*** **	**.0004806**
PROF	_	**-0.07265**	**.00341**	PROF	_	**.01173*** **	**.0009133**	PROF	_	**-.0817712*** **	**.0010314**
ASTANG	+	**.400245**	**.003574**	ASTANG	+	**.26232*** **	**.0019733**	ASTANG	+	**.1326766*** **	**.0007673**
SIZE	+	**-.001250**	**.000123**	SIZE	+	**-.00043*** **	**.0000974**	SIZE	_	**-.0014555*** **	**.0000747**
GROWTH	+	**.030555**	**.001512**	GROWTH	+	**.02531*** **	**.0007296**	GROWTH	+	**.0051615*** **	**.0009923**
AGE	+	**-.00027**	**9.85E-06**	AGE	+	**-.00038*** **	**8.73e-06**	AGE	+	**-.0002102*** **	**7.37e-06**
RISK	_	**8.32E-05**	**3.28E-05**	RISK	_	**3.5106**	**9.95e-06**	RISK	+	**.000289*** **	**.0000105**
LIQUID	_	**-.001079**	**.00020**	LIQUID	_	**-.00534*** **	**.0000809**	LIQUID	_	**.0024775*** **	**.0001607**
ADJUSTMENT SPEED (%) = 63% **AR 1= 0.000 SARGAN = 0.3186** **AR2 = 0.9105 WALD = (8885)*** **				**AR 1= 0.0003** **AR2 = 0.3348**		**SARGAN 0.1469** **WALD = (8.51) *** **		**AR 1= 0.000** **AR2 = 0.8916**		**SARGAN = 0.3805** **WALD = (405275)*** **	

TOTLEV= Total leverage**,** measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk, measured as the standard deviation of return on assets. **LIQUID** = Liquidity, measured as the ratio of current asset to current liability**.** *** shows highest level of significant at 0.01, while ** and * shows significance at 5% 0.10 respectively. **ADJUST SPEED** is the speed of adjustment and is achieved by subtracting the coefficient of lagged total debt (L1) from 1. In GMM, first level autocorrelation is normal. The validity of instruments is confirmed when the P value of the Sargan test is greater than .05.

5.4.1.1 Determinants of Capital Structure Before and After the Financial Crisis

In this section, the current study examines the impact of the crisis on the capital structure determinants for long-term and short-term leverage before and after the financial crisis. Prior studies found that firms' borrowing capacity was negatively affected by diminished lending and increased lending costs during the financial crisis (Ivashina and Scharfstein, 2010, Harrison and Widjaja, 2014, Zeitun et al., 2017, Ali and Afzal, 2012). However, studies on the effect of the financial crisis in sub-Saharan Africa focused only on reduced capital inflows during the financial crisis (Brambila- Macias and Massa, 2010, Allen and Giovannetti, 2011), ignoring its effect on firms' capital structure.

Nigeria provides an idea environment for the examination of the impact of the financial crisis on the relationship between these types of leverage and firm characteristics. The peculiar issues in Nigeria, such as issue of illiquid capital market and prevalence of bank lending, suggest that the impact of the financial crisis on leverage may be significantly different from that experienced by firms in other countries. Iqbal and Kume (2015) suggest that firms' dependence on bank lending may affect their level of vulnerability to a global financial crisis. Since Nigerian firms rely mostly on bank lending, it is, therefore, important to re-examine the determinants of short-term and long-term leverage before and after the financial crisis.

In order to investigate the impact of the crisis on Nigerian non-financial firms, the study sample was split to reflect the pre financial crisis (2001- 2007) and post financial crisis (2010-2015) to understand how determinants of long-term and short-term leverage vary, before and after the crisis. Zeitun et al. (2017) suggest that a financial crisis may lead to different predictions on the relationship between capital structure determinants and leverage, since perfect elasticity of credit supply may be violated during a crisis situation. Owing to the inclusion of a time dummy in the regression, the correlation matrix was employed to detect multicollinearity. The resultant

multicollinearity test shows that the highest correlation (Coef = 0.2365) is between asset tangibility and the time variable, which implies that there is no multicollinearity problem among the independent variables used in the current study (see appendix 5.2).

The regression results for long-term leverage presented in table 5.5 show that before the financial crisis (from 2001-2007), apart from lagged leverage, only asset tangibility and age are positively and significantly related to long-term leverage. Tangibility shows only marginal significance before the financial crisis (Coef. = .025205, $p < 0.071$). This means that Nigerian firms needed tangible assets before the financial crisis in order to secure external debt finance.

Firm age is also positively and significantly related to long-term leverage before the financial crisis and highlights the importance of firms' years of experience when obtaining long-term debt. This result is in line with prior studies which suggest that a firm shows itself as an on-going business (Gregory et al., 2005, Abor, 2008, Saarani and Shahadan, 2013) and signals its transparency track record (Haas and Peeters, 2006) through age. Although profitability is not significant, the sign of its coefficient before the financial crisis is positive, which is as predicted by the trade-off theory.

After the financial crisis, asset tangibility is highly significant and positively related with long-term leverage, meaning that tangibility is the most important capital structure determinant among non-financial firms in Nigeria. This result is particularly important in the post-crisis Nigerian economy where access to finance is limited due to the role of tangibility in reducing lending costs (Titman and Wessels, 1988b, Mackie Mason, 1990, Psillaki and Daskalakis, 2009, Vătavu, 2012, Öztekin, 2015).

Similarly, firm growth has a positive and significant relationship with long-term leverage (Coef. = 0.0288691, $p < 0.043$), which suggests that growing Nigerian firms will use debt to reduce their financing gap. This result is in line with the pecking order theory which supports firms' use of debt in financing their growth when retained earnings are insufficient or unavailable (Myers, 1984,

Myers and Majluf, 1984). Pecking order theory argues, therefore, that firms will issue debt to finance their growth since retained earnings are mostly insufficient when a firm is growing. Harrison and Widjaja (2014) and Van Hoang et al. (2017) documented similar results which suggest firms' pecking order behaviour post- financial crisis.

Business risk is also negatively and significantly related to leverage after the financial crisis, meaning that firms with riskier operations will use less debt. This is also in line with prior empirical studies which show that firm risk has a negative correlation with leverage (Bradley et al., 1984, Kim and Sorensen, 1986, Titman and Wessels, 1988b). A possible explanation for this relationship is that debt finance is associated with regular periodic repayment to firms' lenders, which may have been very costly immediately after the financial crisis. Thus, a high debt ratio of firms with riskier operations will increase the probability of default. Firms with high risk are assumed to be in danger of financial distress (Kim and Sorensen, 1986).

The negative sign of profitability and firm size coefficients post-crisis, regardless of its statistical insignificance, confirms that Nigerian firms overwhelmingly followed pecking order behaviour after the financial crisis. Thus, the result of the current study is in line with those of previous literature which reported that firms' capital structure decisions post-crisis are explained by the pecking order theory (Harrison and Widjaja, 2014, Iqbal and Kume, 2015). For instance, the empirical studies of Iqbal and Kume (2015) on firms in Germany, France and the UK show a significant increase in firms' use of retained earnings post- financial crisis. Similarly, Harrison and Widjaja (2014) reported that pecking order theory explains the capital structure decisions of US firms after the financial crisis due to their less reliance on debt finance.

Firm age shows a positive and highly significant relationship with long-term leverage post- financial crisis (Coef. = 0.002878, $p < 0.0008$), which implies that older firms are more likely to obtain eternal debt finance post- crisis. This is expected due to the contribution of a firm's age in a business being

considered as a going concern (Gregory et al., 2005, Abor, 2008, Saarani and Shahadan, 2013) and in gaining a reputation in the capital market (Diamond, 1989).

From the regression result presented in table 5.6, profitability and age had a positive and significant relationship with short-term leverage before the financial crisis. The sign of their coefficient indicates support for the trade-off theory. However, after the financial crisis, profitability shows a negative and significant relationship with leverage, which implies that profitable Nigerian firms use their own internal sources of funds to avoid higher costs associated with short-term debt. Campello et al. (2010) found that firms reduce their overall demand for debt (including short-term debt) finance due to associated costs and the difficulty involved in raising funds externally.

Liquidity is positively and significantly related to short-term leverage post- crisis. Ozkan (2001) suggests that firms with high liquidity may need more debt to meet their current obligations. These obligations may be interest payment on debt, or repayment of trade credit, in order to maintain a closer relationship with suppliers. Meeting these obligations after the financial crisis may be very important for firms, after the financial crisis, to maintain business relationships with lenders and suppliers.

Asset tangibility shows a positive and significant relationship with leverage, confirming the need for collateral when obtaining short-term leverage. This means that Nigerian firms need to secure their short-term loan to minimise the risk of lending and is in line with the result reported for tangibility in the earlier chapters. The study result also shows that asset tangibility is the most important determinant for Nigerian non-financial firms, since tangibility maintained its positive and significant relationship before and after the financial crisis. This shows the importance of collateral in overcoming the problem of moral hazard (Di Patti and Dell'Ariccia, 2004) and lending risk (Titman and Wessels, 1988b, Mackie Mason, 1990, Psillaki and Daskalakis, 2009, Vătavu, 2012, Öztekin, 2015). This highlights lenders' demand for collateral in such weak regulatory

environments (Fan et al., 2012). This importance of tangibility may also be due to the peculiar financial system in Nigeria. In Nigeria, the banks are the major suppliers of debt finance for non-financial firms. Therefore, Nigerian banks require collateral to make both long-term and short-term lending decisions, which makes asset tangibility the most reliable determinant of firms' capital structure among Nigerian non-financial firms.

Regarding firm age, the study result shows that age is positively and significantly related to both long-term and short-term leverage before and after the financial crisis. However, the level of its significance (1%) is higher after the financial crisis. This shows that a firm's age, which is linked to its experience (Diamond, 1989) and its on-going operations (Gregory et al., 2005, Abor, 2008, Saarani and Shahadan, 2013), will be used by lenders as criteria for their lending decisions. This is in line with prior studies which suggest that firms' age helps in reducing the problem of information asymmetry between firms and lenders (Diamond, 1989, Gwatidzo and Ojah, 2009).

Business risk maintains a negative relationship in all sub-samples (both pre and post financial crisis) suggesting that firms with risk will abstain from debt. However, it is only significantly related with long-term leverage after the financial crisis, which further highlights the importance of reducing dependence on debt after the crisis.

Overall, the results of the current study are in line with prior studies that investigated capital structure determinants before and after the financial crisis (Harrison and Widjaja, 2014, Van Hoang et al., 2017, Zeitun et al., 2017). For instance, Zeitun et al. (2017) examined the impact of the financial crisis on capital structure dynamics of firms in GCC countries and found that asset tangibility is a more relevant determinant of firms' capital structure post- crisis than before the financial crisis.

A similar result for the long-term leverage was documented by Harrison and Widjaja (2014), who examined the impact of the 2008 crisis on the capital structure of the US S&P companies. They

found that asset tangibility showed a significant increase after the financial crisis while the profitability effect declined. Furthermore, Iqbal and Kume (2015), found that leverage ratios went back to their pre-crisis period immediately after the crisis and that highly leveraged firms (before the crisis) acquired less debt after the crisis while firms with low leverage acquired more debt.

Table 5.5: Long-term leverage determinants Pre- and Post-Financial Crisis

Pre-financial Crisis **Post Financial Crisis**

LTLEV	**Coefficient**	**Std. Error**	**LTLEV**	**Coefficient**	**Std. Error**
_Cons	.067618***	.0241565	**_Cons**	0.043554	0.043482
L1	.451991***	.0272928	**L1**	0.252422***	0.027344
PROF	.038389	.0269531	**PROF**	-0.041787	0.050399
ASTANG	.025205*	.0139676	**ASTANG**	0.2937251***	0.028975
SIZE	-.002835	.0024859	**SIZE**	-0.001352	0.003688
GROWTH	.0011555	.0027634	**GROWTH**	0.0288691**	0.014245
AGE	.0016053**	.0006942	**AGE**	0.002878***	0.001055
RISK	-.0001848	.000157	**RISK**	-0.001161*	0.000625
LIQUID	-.001193	.0016184	**LIQUID**	0.0028221	0.005389
TM	-. 002016***	.0007481	**TM**	-0.002965***	0.001019

LTLEV = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book value. **ASTANG** = Asset tangibility, measured as ratio of fixed assets to total assets. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk, measured as the standard deviation of return on assets. **LIQUID** = Liquidity, measured as the ratio of current assets to current liability**.**

Table 5.6: Short-term leverage determinants Pre and Post-Financial Crisis

Pre-financial Crisis **Post Financial Crisis**

STLEV	**Coefficient**	**Std. Error**	**STLEV**	**Coefficient**	**Std. Error**
_Cons	.03033*	0.0175	**_Cons**	-.011603	.02192
L1	.32070***	0.0372	**L1**	.2917763***	.03710
PROF	.05214*	0.0305	**PROF**	-.145259***	.03814
ASTANG	.01173*	0.0332	**ASTANG**	.1450358***	.01631
SIZE	-.00269	0.0031	**SIZE**	.0007963	.00249
GROWTH	.02072	0.0158	**GROWTH**	-.004455	.00394
AGE	.00064**	0.0003	**AGE**	.0008885***	.00034
RISK	-.00009	0.0002	**RISK**	-.0001614	.00042
LIQUID	.00242	0.0020	**LIQUID**	.005277*	.00292
TM	-.00113**	0.0006	**TM**	-.0001655	.00052

LTLEV = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk, measured as the standard deviation of return on assets. **LIQUID** = Liquidity, measured as the ratio of current asset to current liability**.**

5.5 Further Analysis and Robustness Check

In this section, further analysis of the study sample will be undertaken to understand how firms' degrees of indebtedness, firm size and industry influences capital structure determinants of short-term and long-term leverage. This section is also relevant to examine the robustness of the study results presented in table 5.4. Thus, the full study sample is divided into two, based on whether the firm is considered as over-leveraged or under-leveraged and based on firm size. Furthermore, a separate estimation was made based on individual industry to investigate whether the study results are in line with the main study findings.

5.5.1 Degree of Indebtedness

To test the robustness of the study result, the study sample was divided based on the degree of indebtedness (by using the median value of total leverage) and the results presented in appendices 5.3 and 5.4.

Based on the study result, profitability is negatively and significantly related to long-term and short-term leverage of both over-leveraged and under-leveraged firms respectively. Similarly, asset tangibility maintains its positive and significant relationship with long-term and short-term leverage of over-leveraged firms.

Furthermore, the sign and the statistical significance of the firm size coefficient remains unchanged for both long-term and short-term leverage of over-leveraged firms, and the long-term debt of under-leveraged firms is in line with the main study result. For over-leveraged firms, firm growth shows a positive and significant relationship with the long-term, short-term and total leverage. Most of the study variables are in line with the main result reported in table 5.4.

5.5.2 Firm Size

To confirm the study result, the study sample was divided based on median firm size and the regression results are presented below in appendices 5.5 and 5.6 respectively.

In line with the main result reported in table 5.4, profitability shows a negative and significant association with short-term and total leverage for both large and small firms. Asset tangibility coefficients and statistical significance remain unchanged. For the total leverage, the coefficient of firm size is negative for both small and large firms. Firm growth maintained a positive and significant relationship with all types of leverage for both small and large firms. Regarding firm age, the study results show a negative relationship between age and all types of leverage. The results confirm the prevalence of pecking order behaviour and is in line with the main result.

5.5.3 Industry

One of the objectives of this chapter is to examine determinants of long-term and short-term leverage across industry, since prior studies have suggested that determinants of capital structure will vary across industry (DeAngelo and Masulis, 1980, MacKay and Phillips, 2005).

The result (see appendices 5.9a and 5.9b) shows that asset tangibility is the most important determinant of long-term and short-term leverage across all industries. Asset tangibility maintained its positive and significant relationship with long-term debt across all industries investigated. Similarly, profitability shows a negative and significant relationship in the majority of industries (conglomerates, consumer goods and computer technology) in line with the main result.

As seen in the main result, firm growth is positively and significantly related to both long-term and short-term leverage in the majority of industries, meaning that these firms are likely to finance their growth with long-term leverage as predicted by the pecking order theory. Thus, there is evidence of pecking order behaviour across industries, which confirms the main result reported in table 5.4.

5.6 Summary

This study examined the relationship between firm characteristics and long-term and short-term leverage over a 15-year period and found that firm characteristics are determinants of capital structure of non-financial firms in Nigeria. From the main result presented in table 5.4, asset tangibility and firm growth are positively related with both long-term and short-term leverage. Profitability shows a negative and significant relationship with short-term leverage but is positively related with long-term leverage. Firm size and age show a negative and significant relationship with the long-term and short-term leverage. The coefficient signs of most independent variables confirm the dominance of the pecking order theory.

The current study also investigates the impact of the financial crisis on capital structure decisions of Nigerian non-financial firms and found also that firms' characteristics are determinants of capital structure before and after the financial crisis. Asset tangibility is the most important capital structure determinant among non-financial firms in Nigeria before and after the financial crisis. The positive and significant relationship between tangibility and both types of leverage means that Nigerian firms need tangible assets to obtain long-term debt and short-term bank loans.

In order to confirm the study result, further analysis was conducted based on the degree of indebtedness, firm size and industry. These tests confirm the study's main result and support the prevalence of pecking order behaviour among Nigerian non-financial firms.

Chapter Six: Speed of Adjustment of Nigerian non-financial Firms

6.1 Introduction

In this chapter, the current study will discuss the leverage adjustment behaviour of Nigerian non-financial firms. It will also analyse SOA based on the degree of indebtedness, firm size and industry. Finally, the current study will examine the impact of crisis on the leverage adjustment behaviour of the firms in the study sample.

6.2 SOA of Nigerian Non-Financial Firms

The regression results in table 5.4 report overall leverage adjustment speed (using total leverage) for non-financial firms in Nigeria. They show that the lagged total leverage is statistically significant and accounts for about 37% change in total leverage when all other regressors are held constant. This result of the lagged dependent variable is of importance in the dynamic capital structure model, especially when the coefficient of the lagged variable is between 0 and 1 and shows statistical significance, since this implies that debt adjustment policy is followed by these firms in the study sample.

The result also shows the importance of a firm's characteristics in influencing the SOA of Nigerian non-financial firms and is in line with the previous studies (Ozkan, 2001, Hovakimian et al., 2001, Flannery and Rangan, 2006, Byoun, 2008, Clark et al., 2008, Soekarno et al., 2015, Zhou et al., 2016b, Nunes and Serrasqueiro, 2017). Dang et al. (2012) suggest that the relevance of firms' characteristics in the firms' adjustment behaviour is as a result of their differential adjustment costs.

The study's result, presented in table 5.4, shows that the SOA is 63%, which means that only 63 % of the variation between target and actual total leverage is adjusted each year. This moderate adjustment is due to firms' inability to acquire debt finance through the underdeveloped and

illiquid Nigerian stock exchange. This implies that the large adjustment coefficient, which is more than 0.5, is attributable to the low level of public debt used by Nigerian firms. The result of the current study also suggests that Nigerian non-financial firms adjust their total leverage relatively quicker (slightly above midway), balancing both the actual adjustment cost and cost of being away from the target.

This result is similar to the SOA result (65.5%) reported by Ramjee and Gwatidzo (2012) for both total debt of South African non-financial firms. However, it is slightly higher than the SOA of 50% reported by Bhaduri (2002) for Indian listed companies. Drobetz and Fix (2003a) reported SOA of 80% for Swiss firms, while De Miguel and Pindado (2001) reported SOA of 79% for firms in Spain, which are both higher than the current study's result, and attributed this to the use of bank lending. De Miguel and Pindado (2001) argued that the higher SOA reported in their study is linked to the underdeveloped Spanish bond market, causing firms to acquire debt finance through bank lending and other sources. For Drobetz and Fix (2003a), using bank finance allows Swiss firms to adjust their leverage speedily due to its low transaction costs. However, the 63% SOA reported for Nigerian firms suggests that the bank debt in Nigeria may be costlier than in Spain and Switzerland, and may have led to a moderate adjustment.

In contrast, the SOA reported for firms in developed countries, where firms have access to public debt, shows either slow or moderate speeds of adjustment. For instance, Dang et al. (2012), Antoniou et al. (2008) and Flannery and Rangan (2006), document evidence of 30%, 32% and 34% speeds of adjustment respectively for US firms. Similarly, Antoniou et al. (2008) show 32% SOA for UK firms and 39% for French firms, suggesting that firms in developed countries have a lower speed of adjustment when compared to firms in developing countries. This means that the variation in the reported SOA is related to varying access to the public debt market (Aybar-Arias et al., 2012).

The current study identified firm characteristics as determinants of speed of adjustment. It found that profitability, asset tangibility, firm size, firm growth, age, business risk and liquidity influence the adjustment behaviour of Nigerian non-financial firms. The majority of prior studies found that firm characteristics play a significant role in firms' speed of adjustment (Ozkan, 2001, Hovakimian et al., 2001, Flannery and Rangan, 2006, Byoun, 2008, Clark et al., 2008, Soekarno et al., 2015, Zhou et al., 2016b, Nunes and Serrasqueiro, 2017). Dang et al. (2012) suggest that the relevance of firm-level factors in the adjustment process is due to differential costs of adjustment resulting from variations in firms' characteristics.

6.3 Factors Influencing SOA

In this section, the current study examines the impact of degree of indebtedness on SOA and differences in the SOA of large and small firms in Nigeria. It will also examine the variation of SOA across industries. As in the main result, the dependent variables are long-term leverage and short-term leverage for both larger and smaller firms. The independent variables are profitability, asset tangibility, size, growth, age, risk and liquidity. The SOA is also based on the total leverage to ensure uniformity of approach.

6.3.1 SOA and Degree of Indebtedness

The current study groups the study sample based on the degree of indebtedness (by using the median value of total leverage) since a varying degree of adjustment cost and cost of being away from the target leverage are expected. The result of the estimation is presented in appendices 5.3 and 5.4. It is important to emphasise that, similarly to the main result, SOA calculation will be based on total leverage.

In line with the main result in table 5.4, the lagged variables of total leverage have positive coefficients which are between zero and one, and significant at a 1 % level, showing that both under-leveraged and over-leveraged firms follow the adjustment process. The results show that the SOA

for over-leveraged and under-leveraged firms are 70% and 75% respectively. This suggests that, for both, the relatively high cost of deviation from their target leverage ratio may outweigh any possible adjustment cost.

However, the speed of adjustment is slightly lower (5%) for over-leveraged firms when compared to under-leveraged firms. This confirms the study hypothesis (**H1b**), which proposes a higher SOA for firms that are below their leverage target. Nevertheless, the result does not support the low adjustment predicted for over-leveraged firms (**H1a**) since the result showed 70% SOA for firms that are above their target. Prior studies document evidence that the adjustment speed of over-leveraged firms may be affected by a possible cost of adjustment (Clark et al., 2008, Dang et al., 2014, Castro et al., 2014).

The slightly higher adjustment (5%) reported for under-leveraged firms in this study is in line with that of Drobetz and Wanzenried (2006), Byoun (2008) and Smith et al. (2015), who found that firms that are below their target are more likely to make rapid adjustment compared to those that are above their leverage target. Dang et al. (2011) argued that firms with low leverage are more likely to issue more debt to reduce their financing deficits. The author suggests that this will help firms to adjust faster to their leverage target.

Overall, the study shows that there is adjustment behaviour irrespective of the degree of indebtedness, and thus confirms the dynamic nature of capital structure. Under-leveraged firms have a faster adjustment speed (75%) when compared to over-leveraged firms' SOA of 70%, suggesting that the cost to deviation from their capital structure may be higher for the under-leveraged firms.

6.3.2 SOA and Firm Size

Prior studies have also identified firm size as a major determinant of capital structure choice (Titman and Wessels, 1988b, Bevan and Danbolt, 2002, Chen, 2004, Deesomsak et al., 2004, Abor and Biekpe, 2009) and argues for its impact in the speed of adjustment (Flannery and Hankins, 2007, Byoun, 2008, Castro et al., 2014). Similarly to the main result in table 5.4, the lagged total leverage has positive coefficients which are between zero and one, and is highly significant at a 1 % level. This implies that both large and small Nigerian non-financial firms adjust their capital structure.

The results (see appendices 5.5 and 5.6) show also that the SOA for large and small firms are 50% and 58% respectively, suggesting a slower leverage adjustment process for both types of firm. The slightly higher SOA for small firms may be due to a higher proportion of short-term leverage used by smaller firms when compared to larger firms. Aybar-Arias et al. (2012) argue that the need for re-negotiation and restructuring of short-term leverage may influence the adjustment behaviour. However, the result failed to support the study's hypothesis (H2b) since adjustment speed could be described as a midway adjustment (Ozkan, 2001).

For smaller firms, this slower adjustment means that the cost of deviating from their target leverage may be similar to their adjustment cost. Prior studies suggest that smaller firms are often discriminated against when they apply for debt finance (Abor and Biekpe, 2009, Ebel Ezeoha, 2008) which may be due to reduced tangibility of their assets and lack of diversification. This is likely to increase their issuance cost for debt finance, thereby discouraging their speedier adjustment process, even in the face of a large financing gap.

For large firms, the adjustment speed is 50%. This confirms the study hypothesis (H2a), which suggests slow adjustment due to reduced benefits of adjustment. This implies that these firms balance the adjustment cost and the possible cost of deviating from their target leverage.

This lower SOA may also mean that large firms' diversified operations (Rajan and Zingales, 1995, Vătavu, 2012), reduced volatility of cash flow (Fama and French, 2002b) and bankruptcy risk (Nagano, 2003) has equally minimised their financial distress cost enabling firms to ignore any benefits resulting from speedy adjustment of their leverage. Large firms have lower issuance costs for both debt and equity, leading to a moderate speed of adjustment for large firms (Castro et al., 2014, Lemma and Negash, 2014). Lemma and Negash (2014) argue that, due to minimal levels of financial distress cost for larger firms, it will be unlikely that these firms will show any speedy adjustment.

6.3.3 SOA Across Industry

Prior literature suggests that firms' industrial affiliation may have an impact on their capital structure decisions (DeAngelo and Masulis, 1980, Masulis, 1983, Harris and Raviv, 1991, Frank and Goyal, 2009, MacKay and Phillips, 2005). DeAngelo and Masulis (1980), Bradley et al. (1984), Harris and Raviv (1991) and Anwar (2013) suggested a unique leverage ratio among firms in a particular industry. Pinkova and Riederova (2013) argue that firms seek to adjust to industry averages as their target ratio.

However, these studies failed to discuss the SOA across industries. One of the major contributions of the dynamic capital structure literature is the recognition that firms' adjustment to optimal leverage may vary across industries (Byoun, 2008, Castro et al., 2014).

The adjustment process is evident when λ is less than one but is greater than zero ($1 > \lambda > 0$) for each industry and when there is meaningful statistical significance (i.e. P-value ≤ 0.05).

In order to examine the determinants (firm characteristics) of target leverage and the speed of adjustment across different industries, the current study employed the one-step GMM system of Arellano and Bover (1995) and Blundell and Bond (1998). The Wald test and Sargan test are also employed to ensure the validity of the study findings.

Consistent with the study's aims and objectives, the current study employed total leverage in the estimation of adjustment speed across industry. The independent variables used are firm characteristics, which, according to prior studies, have a significant effect in determining optimal leverage across industry (Ozkan, 2001, Flannery and Rangan, 2006, Brendea, 2014, Haron, 2014, Mangafić and Martinović, 2015)

The regression reports a positive coefficient of the lagged total leverage which is significant at 1 % level for 9 industries and 5% percent level for the oil and gas industry and confirms the dynamic debt adjustment policy across industries, except construction and real estate.

There is also considerable variation in the adjustment speed across different industries. Extremely high SOA is found among oil and gas firms (83%), industrial goods firms (76%), computer and information technology (74%) and natural resources (72%). In contrast, very low adjustment speed is reported in the service sector (41%).

Furthermore, firms in conglomerates show moderate adjustment (68%), while firms in consumer goods and health care sectors report SOA of 51% and 56% respectively, which is evidence of what Ozkan (2001) called mid-way adjustment. This result confirms an absence of SOA homogeneity across industry as reported by previous studies (Ozkan, 2001, Drobetz and Wanzenried, 2006, Brendea, 2014, Abdeljawad et al., 2017). These varying adjustment speeds (extremely high, high, moderate and low) confirm the variation of costs and benefits of adjustment across industry and confirms the study's hypothesis (**H3a**).

This varying SOA shows that firms' industry has an impact on the firms' capital structure and is in line with previous studies (DeAngelo and Masulis, 1980, Masulis, 1983, Harris and Raviv, 1991, Frank and Goyal, 2009, MacKay and Phillips, 2005, Roberts, 2002, Flannery and Rangan, 2006). A similar finding was reported by Roberts (2002) who documented evidence of significant variation in the adjustment speed to target leverage across industries. These differences may be as a result of differences in costs and benefits of adjustment. The average SOA across 10 industries in the study

sample is 64.2%, which suggests a moderate overall adjustment speed. Similarly to the result of Roberts (2002), the current study found significant variation in the adjustment speed across industries.

The highest SOA (83%) is found in the oil and gas sector, meaning that 83% of the variation between target and actual total leverage is achieved in this sector each year. This higher speed of adjustment suggests that the cost of adjustment is very small in this sector, making it easier for firms to speedily move to their target. It could also mean that the risk of being below their target leverage is very high, or that the low long-term and short-term leverage ratio of oil and gas firms make it necessary for these firms to avoid further costly deviation from target.

However, the slow adjustment speed of service sector firms (41%) shows that the adjustment cost may be too high for firms in this sector. This confirms the findings of previous studies, which show that the cost of adjustment may hinder a rapid adjustment speed (Flannery and Rangan, 2006, Ozkan, 2001, Clark et al., 2008, Soekarno et al., 2015, Zhou et al., 2016b, Nunes and Serrasqueiro, 2017). Drobetz and Wanzenried (2006) suggest that, when a firm faces costly adjustment, it may be beneficial to avoid full adjustment to target leverage irrespective of how far it is from its leverage target.

Table 6.1 : SOA Across Industries

Industry	NSE CODE	Coef.Totlev/ Sig	SOA
AGRICULTURE	01	.4226***	58%
CONGLOMERATE	02	.3194***	68%
CONSUMER GOODS	04	.4902***	51%
HEALTH CARE	05	.4446***	56%
COMPUTER/INFORMATION	06	.2570***	74%
INDUSTRIAL GOODS	07	.2390***	76%
NATURAL RESOURCES	08	.2766***	72%
OIL AND GAS	09	.1656**	83%
SERVICES	10	.5950***	41%

Note: NSE CODE=Nigerian stock exchange industrial classification code. SOA = Speed of adjustment. *** shows highest level of significant at 0.01, while ** and * shows significance at 5% and 10% respectively.

For conglomerates, and construction and real estate firms, the lagged leverage is not significant, showing the absence of adjustment behaviour. On the other hand, the relatively slow SOA of consumer goods firms (51%) and firms in the healthcare sector (56%) could mean that both adjustment cost and cost of deviation may be equal for these firms. Thus, increasing adjustment speed may not be in the interest of the firm.

In contrast to the study of Flannery and Rangan (2006), who found that firms adjust slowly towards their leverage targets, the current study documents evidence which shows the absence of a uniform

speed of adjustment across industries, in line with several studies (Dang et al., 2014, Faulkender and Petersen, 2006, Abdeljawad et al., 2017). The result of this study shows a systematic difference with regards to SOA across these industries and confirms the current study's hypothesis (**H3b).** This variation in SOA across industries in Nigeria may be due to differences in asset structure across different industries. This is because the level of tangibility of assets will influence the ease of access to both short-term and long-term debt finance in Nigeria, as reported in the main results. Muradoğlu Yaz Gulnur and Sivaprasad (2012) argue that different asset structures across various industries will influence financing options. Kakilli Acaravci (2015) suggests that firms in manufacturing industries will have more tangible assets and will use this as collateral to increase their debt ratio, unlike firms in the service sector.

6.4 Financial Crisis and SOA

Prior studies have examined the impact of the financial crisis on the firms' capital structure decisions and found that firms' borrowing capacity was negatively affected by diminished lending and increased lending costs during the financial crisis (Harrison and Widjaja, 2014, Zeitun et al., 2017, Ali and Afzal, 2012). Since Nigerian firms relied mostly on costly bank lending even before the financial, it is, therefore, important to re-examine how the financial crisis affected firms' adjustment behaviour for long-term and short-term leverage before and after the crisis. Consequently, the study sample was split to reflect both the pre-financial crisis (2001- 2007) and the post financial crisis (2010-2015) to understand how SOA of these two types of debt were affected by these two separate periods.

The regression results presented in tables 5.5 and 5.6 show that the lagged long-term and short-term leverage is statistically significant in the pre-financial crisis and post-financial crisis periods, showing that firms' adjustment behaviour is upheld both before and after the financial crisis. This is in line with previous studies, which showed that firms adjust their leverage to a specific target

before and after a financial crisis (Harrison and Widjaja, 2014, Dang et al., 2014, Iqbal and Kume, 2015, Zeitun et al., 2017, Abdeljawad et al., 2017).

The adjustment speed for long-term leverage before the financial crisis was 55% and this increased to 75 % immediately after the financial crisis, which means that the speed of adjustment was faster after the financial crisis. This contradicts the study's hypothesis (**H4a**), which predicts a lower SOA after the financial crisis. The SOA for short-term leverage before the financial crisis is 68% and this increases to 71 % immediately after the financial crisis, confirming the study hypothesis (H4b)

One possible explanation of this significantly higher speed of adjustment is the gap between the actual and the target advantage. This is as a result of firms' inability to reach their leverage target during the peak of the financial crisis (Hackbarth et al., 2006), partly due to deterioration of their collateral value (Kiyotaki and Moore, 1997) and limited bank lending during the crisis period. Furthermore, this may be related to the reduced capital inflows during the financial crisis (Brambila-Macias and Massa, 2010, Allen and Giovannetti, 2011). The implication is the widening of the financing gap, which is the difference between the actual and the target leverage immediately after the financial crisis.

In the case of Nigerian non-financial firms, the significantly higher SOA after the crisis may also be due to government support programmes after the crisis, which offer financial flexibility to firms allowing them to increase their long-term and short-term obligations without incurring higher costs. This may explain the speedier adjustment after the financial crisis. This financial support, given by the Nigerian government, created a favourable atmosphere for firms and reduced the cost of debt, making it easier for firms to close their financing gap. Dang et al. (2014) argue that firms' financing gap will be the most important consideration in their trade-off decisions. Other studies also show that financially constrained firms may prefer speedy adjustments to close their financial gap (Byoun, 2008, Aybar-Arias et al., 2012, Dang et al., 2014).

6.5 Summary

This chapter examined the adjustment behaviour of Nigerian non-financial firms and found a positive sign of the coefficient of lagged total leverage, which is statistically significant at a 1 % level, confirming that these firms adjust their total leverage. The study's result shows that the SOA is 63% meaning that 63 % of the variation between target and actual total leverage is adjusted each year. Since this is above midway, it could be described as a moderate adjustment speed.

The result of further analysis shows that there is adjustment behaviour irrespective of the degree of indebtedness and size and, thus, confirms the dynamic nature of capital structure. Under-leveraged firms have a slightly higher SOA when compared to over-leveraged firms, suggesting that the cost to deviation from their target leverage may be higher. Furthermore, smaller firms adjust their leverage faster than larger firms. (Harrison and Widjaja, 2014, Dang et al., 2014, Iqbal and Kume, 2015, Zeitun et al., 2017, Abdeljawad et al., 2017).

The adjustment speed for long-term leverage before the financial crisis is 55% and this increased to 75 % immediately after the financial crisis. Similarly, the SOA for short-term leverage before the financial crisis is 68% and this increases to 71 % immediately after the financial crisis, meaning that SOA was faster after the financial crisis.

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Chapter Seven: Conclusion

7.1. Introduction

The study aims to examine the capital structure determinants and SOA of all listed, non-financial firms in Nigeria taking into consideration the unique institutional environment of this West African country. The objectives are; to investigate the relationship between firm characteristics and the capital structure choice among non-financial firms listed on the Nigerian Stock Exchange, to examine whether the financial crisis affected capital structure determinants. The study also examines the speed of leverage adjustment (SOA) of Nigerian non-financial firms and the impact of the financial crisis on the SOA. This study employs the trade-off and the pecking order theory as the main study theories. The underlying issue in the pecking order theory is the reduction of asymmetric information. Myers and Majluf (1984) and Myers (1984) argued that, to avoid the risk of underinvestment, managers will fund their new investments using a pecking order of financing whereby internally generated funds (retained earnings) are first used, then debt and finally equity as the last option.

The trade-off theory is an attempt to relax the 'no tax and bankruptcy cost' assumptions of Modigliani and Miller (1958b). This theory argues that a firm will 'trade-off' tax advantage and other benefits associated with leverage against financial distress costs and other potential costs resulting from a debt finance option (Bradley et al., 1984, Harris and Raviv, 1991, Graham and Harvey, 2001). However, the static trade-off theory is highly focused on the idea of observed leverage and ignores the dynamism involved in the capital structure decision (Drobetz and Wanzenried, 2006). Consequently, this study uses a dynamic capital structure model which recognises adjustment costs ignored by the static trade-off theory (Leary and Roberts, 2005, Hennessy and Whited, 2005, Almeida and Philippon, 2007, Abdeljawad et al., 2017) and the long-

run leverage targets. It emphasises the possibility of gradual adjustment towards a leverage target (Gaud et al., 2005, Hennessy and Whited, 2005, Haron, 2014, Yang et al., 2015).

7.2. Capital Structure Determinants of Non-financial firms in Nigeria.

The first objective of the current study is to examine firm level factors that determine capital structure among listed non-financial firms in Nigeria. The findings relating to this objective are presented in chapter 5.

Regarding capital structure determinants, the current study reports a positive and significant correlation between profitability and the long-term leverage, which supports the assumption of the trade-off theory. The theory suggests that tax deductibility of interest expense and a lower default risk will result in higher debt ratios among profitable firms (Kraus and Litzenberger, 1973, Scott Jr, 1976). However, a negative and highly significant relationship exists between profitability and short-term leverage, which is in line with the pecking order theory's assumption that profitable firms will rely more on their retained earnings and use debt only when internally generated fund is unavailable or insufficient (Myers and Majluf, 1984).

Similarly, a negative and significant relationship was found between profitability and total leverage and points to the dominance of pecking order behaviour among Nigerian non-financial firms. One possible explanation of the negative relationship between profitability, short-term leverage and total leverage is that Nigerian firms may show more preference for equity rather than debt because of its relative costliness. The result also shows that asset tangibility is the most important capital structure determinant for Nigerian listed firms, due to its positive and highly significant relationship with both long-term and short-term leverage. This may be due to its role in reducing information gap between borrowers and lenders (Myers and Majluf, 1984, Harris and Raviv, 1991), the reduction of moral hazard (Di Patti and Dell'Ariccia, 2004) and its influence on the overall lending cost. Furthermore, this study shows a negative and significant relationship between firm size and both

long- and short-term leverage and total leverage, meaning that as the size increases, the attractiveness of debt financing decreases among these Nigerian firms. Rajan and Zingales (1995) suggested that firm size may act as inverse proxy for the level of asymmetric information between investors and managers. This may be interpreted as being in favour of the pecking order theory, since studies that support firms' usage of retained earnings show a negative association between firm size and all types of leverage (Fama and French, 2002b, Drobetz and Fix, 2003a, Köksal and Orman, 2015). In addition, firm growth shows a positive and significant relationship with long-term and short-term leverage. Firm age is negatively and significantly associated with short-term and long-term leverage.

Regarding liquidity, the study result shows a negative and significant relationship between liquidity and long-term and total leverage.This is expected under pecking order assumptions since the liquidity of firms' assets may lead to a lower cost of equity, thereby making equity issuance more likely than debt (Lipson and Mortal, 2009). However, for short-term leverage, a positive and significant relationship with firm growth is reported, and implies that firms' liquidity does not reduce their short-term leverage. This may be justifiable, since short-term debt is only about one third of the total leverage of Nigerian firms and is needed to boost firms' financing options in such an environment, where access to external debt finance is restricted due to an underdeveloped capital market. This positive relationship also does not violate the pecking order assumption since short-term debt has lower asymmetric information (Myers, 1977) and is, thus, preferred in the pecking order of finance before long-term debt and equity.

Overall, in spite of the existence of adjustment behaviour, the whole result of the current study presented in this chapter is interpreted in favour of the pecking order theory since the coefficient sign of the majority of independent variables are based on its predictions. Shyam-Sunder and Myers (1999) argued that the pecking order theory is not invalidated by the mere existence of target

leverage adjustment behaviour among firms, while Fama and French (2005) warned that it is inappropriate to involve both theories in an empirical horse race.

Furthermore, the impact of the financial crisis on the capital structure determinants of Nigerian non-financial firms was examined in this study. The study sample was split to reflect the pre-financial crisis (2001- 2007) and post financial crisis (2010-2015) to understand how determinants of long-term and short-term leverage vary, before and after the crisis. The positive relationship between asset tangibility and leverage remain unchanged before and after the financial crisis. However, the size of coefficient and significance level of most of the independent variables change after the financial crisis.

7.3. SOA of Nigerian non-Financial firms

In Chapter 6, this study examines the SOA of Nigerian non-financial firms. The study's result, presented in table 5.4, shows that the SOA is 63%, which means that only 63 % of the variation between target and actual total leverage is adjusted each year. This moderate adjustment is due to their inability to acquire debt finance through the underdeveloped and illiquid Nigerian stock exchange. This implies that the large adjustment coefficient, which is more than 0.5, is attributable to the low level of public debt used by Nigerian firms.

On the impact of the degree of indebtedness on leverage, the results show that the SOA for over-leveraged and under-leveraged firms are 70% and 75% respectively. This suggests that, for both, the relatively high cost of deviation from their target leverage ratio may outweigh any possible adjustment cost. The results show also that firm size will influence the SOA. The SOA for large and small firms are 50% and 58% respectively, suggesting a slower leverage adjustment process for both types of firm. The slightly higher SOA for small firms may be due to a higher proportion of short-term leverage used by smaller firms when compared to larger firms.

The current study found varying (very high, high, moderate and low) speeds of adjustment across 10 industries identified in the study sample. The highest SOA is found among oil and gas firms (83%), industrial goods firms (76%), computer and information technology (74%) and natural resources (72%). High adjustment speed is reported for firms in construction and real estate (68%) and conglomerates (63%) while moderate SOA is reported for consumer goods, and health care sectors report SOA of 51% and 58% respectively. Low SOA is reported for service sector firms (41%). The average SOA across 10 industries in the study sample is 64.2%, which suggests a moderate overall adjustment speed. The variation in the speed of adjustment is due to differences in the cost and benefits of adjustment across industries and confirms the impact of firms' industrial affiliation in their capital structure decisions, as suggested by prior capital structure literature (DeAngelo and Masulis, 1980, Masulis, 1983, Harris and Raviv, 1991, Frank and Goyal, 2009, MacKay and Phillips, 2005, Roberts, 2002, Flannery and Rangan, 2006).

Finally, the impact of the financial crisis on SOA was investigated by the current study. The result shows that the adjustment speed for long-term leverage before the financial crisis was 55%, this increased to 75 % immediately after the financial crisis. This implies that the speed of adjustment is faster after a financial crisis. The SOA for short-term leverage before the financial crisis is 68%, and this increases to 71 % immediately after the financial crisis. Overall, the study result shows that Nigerian non-financial firms show speedier leverage adjustment after a financial crisis.

Table 7.1 Key Findings of Capital Structure Determinants			
	Total Leverage	**Short-Term Leverage**	**Long-Term Leverage**
Profitability	Negative	Negative	Positive
Asset Tangibility	Positive	Positive	Positive
Size	Negative	Negative	Negative
Growth	Positive	Positive	Positive
Age	Negative	Negative	Negative
Risk	Positive	Positive	Positive
Liquidity	Negative	Negative	Positive

TOTLEV= Total leverage**,** measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk,measured as the standard deviation of return on assets. **LIQUID** = Liquidity, measured as the ratio of current assets to current liability**.**

Table 7.2 Key Findings of SOA	**Adjustment Speed (%)**
Overall SOA	63%
Agriculture	58%
Conglomerate	68%
Consumer goods	51%
Health care	56%
Computer/information	74%
Industrial goods	76%
Natural resources	72%
Oil and gas	83%

Nigerian Stock Exchange (NSE) classified firms into 12 different industries. However, this study excludes financial service and utility firms. **ADJUST SPEED** is the speed of adjustment and is achieved by subtracting the coefficient of lagged total debt (L1) from 1. In GMM, first level autocorrelation is normal. The validity of instruments is confirmed when the P value of the Sargan test is greater than .05.

7.4. The Study's Implications

The underdeveloped capital market in Nigeria and the competition with commercial banks has led to a reliance of firms on bank lending as the major source of finance. This dominance of bank lending has also led to an increasing importance of collateral in lending decisions. As seen in the study's results, lenders in Nigeria will demand tangible assets as collateral to secure both their long-term and short-term assets and to minimise the overall risk of lending in such an environment marked by limited protection for lenders. However, there is need for a diversified financial system enabling firms to acquire part of their finance through the bond market to restore market discipline.

This development may be related to the adoption of pecking order behaviour, whereby firms used internal resources before debt and equity to reduce the high cost of borrowing long-term and short-term debt from commercial banks. The low level of short-term debt of these firms and their high adjustment speed suggest that Nigerian firms are not able to take advantage of short-term lending to close their financial gap. This is expected given the weak institutional environment in Nigeria.

Furthermore, the difference in SOA of 63 reported in this study and that of other studies conducted in Spain (De Miguel and Pindado, 2001) and Switzerland (Drobetz and Fix, 2003a), where firms use bank lending, show that, unlike in these developed countries, the cost of bank lending in Nigeria is hindering firms' SOA.

Due to the variation in asymmetric information and agency problems in many developing countries, care should be taken when embarking on a cross-cultural study. This means that it may be relevant to focus on firms in a particular country to better examine factors that affect its capital structure.

It is also important to be specific about the type of leverage analysed, since the signs of most coefficients reported in this study change depending on the type of debt considered. This confirms the empirical findings of Bevan and Danbolt (2002).

7.5. Limitations of the Study and Suggestion for Future Research

This study examined the firm characteristics that influence capital structure decisions among Nigerian firms. However, many studies have also suggested the impact of firms' institutional environment on firms' capital structure decisions (Öztekin and Flannery, 2012, Gwatidzo and Ojah, 2014). Since this study is based on capital structure decisions of firms in Nigeria, it ignored the impact of the legal, political and regulatory environment on firms' capital structure which, when added to firm-level determinants, may have given a better understanding of factors influencing the financing behaviour of Nigerian firms. For instance, it is possible that corruption will explain the capital structure of non-financial firms in Nigeria. Hence, the impact of corruption on the financing decision of Nigerian firms may be worthwhile to examine in the future.

In addition, prior studies suggested that corporate governance characteristics may affect firms' capital structure (Wen et al., 2002, Bokpin and Arko, 2009, Morellec et al., 2012, Chang et al., 2014) suggesting that leverage ratio may depend on the governance structure in place. This issue is not taken into consideration by the current study.

Due to the unavailability of data, this study considered only listed Nigerian firms. However, the majority of Nigerian firms are not listed and, if added, could provide further evidence on firms financing decisions in Nigeria. There is also a possibility of significant variation in financing behaviour between unlisted and listed firms. Therefore, this may be an area for future research to gain better understanding of the capital structure decisions of Nigerian firms.

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APPENDICES

Appendix 5.1: Test of Auto correlation for Long-term leverage

. estat abond

Arellano-Bond test for zero autocorrelation in first-differenced errors

Order	z	Prob > z
1	-3.5757	0.0003
2	-.96455	0.3348

H0: no autocorrelation

. estat sargan
Sargan test of overidentifying restrictions
H0: overidentifying restrictions are valid

chi2(103) = 118.0874
Prob > chi2 = 0.1469

Appendix 5.1.1: Test of Auto correlation for Short-term leverage

Arellano-Bond test for zero autocorrelation in first-differenced errors

Order	z	Prob > z
1	-4.6413	0.0000
2	.13629	0.8916

H0: no autocorrelation

. estat sargan
Sargan test of overidentifying restrictions
H0: overidentifying restrictions are valid

chi2(103) = 106.7436
Prob > chi2 = 0.3805

Appendix 5.2: Correlation Matrix (inclusion of time dummy)

Correlation Matrix

	LTLEV	STLEV	PROF	ASTANG	SIZE	GROWTH	AGE	RISK	LIQUID	TM
LTLEV	**1.0000**									
STLEV	**0.3953**	**1.0000**								
PROF	**-0.0799**	**-0.0946**	**1.0000**							
ASTANG	**0.3673**	**0.2413**	**-0.0748**	**1.0000**						
SIZE	**0.0558**	**0.186**	**0.1176**	**-0.0894**	**1.0000**					
GROWTH	**0.1003**	**0.0536**	**-0.0331**	**0.1004**	**-0.0671**	**1.0000**				
AGE	**0.0207**	**0.1245**	**-0.0221**	**0.0572**	**0.1363**	**-0.0111**	**1.0000**			
RISK	**-0.0233**	**0.064**	**-0.0896**	**0.1239**	**-0.2168**	**0.1126**	**-0.0346**	**1.0000**		
LIQUID	**-0.0221**	**0.0238**	**-0.0005**	**-0.0262**	**-0.0445**	**0.0193**	**-0.0319**	**-0.0231**	**1.0000**	
TM	**0.0479**	**-0.0159**	**0.1231**	**0.2365**	**0.1209**	**0.0307**	**0.214**	**-0.1212**	**0.0691**	**1.0000**

LTLEV = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability**.**

Appendix: 5.3: Capital Structure Determinants and SOA for Over-leveraged Firms

TOTLEV	Exp. Sign	Coefficient	Std. Error	LTLEV	Exp. Sign	Coefficient	Std. Error	STLEV	Exp. Sign	Coefficient	Std. Error
_Cons	+	**.29356*** **	**.004334**	_Cons	+	**.185537*** **	**.0007258**	**_Cons**	+	**.094925*** **	.00120
L1	+	**.30408*** **	**.003179**	L1	+	**.421633*** **	**.0002270**	**L1**	+	**.132031*** **	.001704
PROF	_	**-.15517*** **	**.008054**	PROF	_	**-.073285*** **	**.0009133**	**PROF**	_	**-.08449*** **	.002880
ASTANG	+	**.26235*** **	**.002643**	ASTANG	+	**.183556*** **	**.0019733**	**ASTANG**	+	**.074398*** **	.001668
SIZE	+	**-.0188*** **	**.000341**	SIZE	+	**-.008571*** **	**.0000974**	**SIZE**	_	**-.00906*** **	.000167
GROWTH	+	**.00454*** **	**.000738**	GROWTH	+	**.011987*** **	**.0007296**	**GROWTH**	+	**-.00208** **	.00098
AGE	+	**.00070*** **	**.000018**	AGE	+	**.000188*** **	**8.73e-06**	**AGE**	+	**.000684*** **	.000012
RISK	_	**-.00018*** **	**.000042**	RISK	_	**-.000296*** **	**9.95e-06**	**RISK**	+	**.000567*** **	.000027
LIQUID		**.00302*** **	**.000210**	LIQUID	_	**-.013475** **	**.0000809**	**LIQUID**	_	**.008791*** **	.000204
ADJUSTMENT SPEED (%) = 70% **AR 1= 0.0004 SARGAN = 0.99** **AR2 = 0.9294 WALD = (153001)*** **				**AR1= 0.0088** **AR2= 0.6294**		**SARGAN 0.997** **WALD = (4070000) *** **		**AR 1= 0.0003** **AR2 = 0.8887**		**SARGAN = 0.9988** **WALD = (466220.8)*** **	

TOTLEV= Total leverage**,** measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability**.** *** shows highest level of significant at 0.01, while ** and * shows significance at 5% 0.10 respectively. **ADJUST SPEED** is the speed of adjustment and is achieved by subtracting the coefficient of lagged total debt (L1) from 1. In GMM, first level autocorrelation is expected. The validity of instruments is confirmed when the P value of the Sargan test is greater than .05.

Appendix: 5.4: Capital Structure Determinants and SOA for Under-leveraged Firms

TOTLEV	Exp. Sign	Coefficient	Std. Error	LTLEV	Exp. Sign	Coefficient	Std. Error	STLEV	Exp. Sign	Coefficient	Std. Error
_Cons	+	**.11068*** **	**.001401**	**_Cons**	**+**	**.10293*** **	**.000661**	**_Cons**	+	**.012532**	**.000533**
L1	+	**.25131*** **	**.006837**	**L1**	**+**	**.32225*** **	**.00322**	**L1**	+	**.21676**	**.001018**
PROF	_	**-.03291*** **	**.002227**	**PROF**	**_**	**-.0174*** **	**.000691**	**PROF**	_	**-.01078**	**.001282**
ASTANG	+	**.34194*** **	**.00709**	**ASTANG**	**+**	**.10515*** **	**.002359**	**ASTANG**	+	**.242791**	**.003974**
SIZE	+	**-.00010**	**.00011**	**SIZE**	**+**	**-2.23E*** **	**.63E-05**	**SIZE**	_	**.0002**	**.23E-05**
GROWTH	+	**.00015**	**.000838**	**GROWTH**	**+**	**-2.85E*** **	**.000151**	**GROWTH**	+	**.003777**	**.000325**
AGE	+	**.000127*** **	**1.98E-05**	**AGE**	**+**	**.00012*** **	**.44E-06**	**AGE**	+	**-7.6E-05**	**.84E-06**
RISK	_	**.000329*** **	**1.68E-05**	**RISK**	**_**	**.00014*** **	**.34E-06**	**RISK**	+	**.000177**	**.57E-06**
LIQUID		**.000695*** **	**3.16E-05**	**LIQUID**	**_**	**.000444*** **	**.26E-05**	**LIQUID**	_	**.001285**	**.33E-05**
ADJUSTMENT SPEED (%) = 75% **AR 1= 0.0062 SARGAN = 0.9985** **AR2 = 0.2190 WALD = (61217)*** **				**AR 1= 0.0613** **AR2 = 0.1670**		**SARGAN 0.9982** **WALD = (1.03e+06) *** **		**AR 1= 0.0202** **AR2 = 0.3232**		**SARGAN = 0.9946** **WALD = (242741)*** **	

TOTLEV= Total leverage**,** measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability**.** *** shows highest level of significant at 0.01, while ** and * shows significance at 5% 0.10 respectively. **ADJUST SPEED** is the speed of adjustment and is achieved by subtracting the coefficient of lagged total debt (L1) from 1. In GMM, first level autocorrelation is expected. The validity of instruments is confirmed when the P value of the Sargan test is greater than .05.

Appendix: 5.5: Capital Structure Determinants and SOA for Large Firms

TOTLEV	Exp. Sign	Coefficient	Std. Error	LTLEV	Exp. Sign	Coefficient	Std. Error	STLEV	Exp. Sign	Coefficient	Std. Error
_Cons	+	.19150***	.00137	_Cons	+	.1227***	.00047	_Cons	+	0.1131***	.000648
L1	+	.49662***	.00058	L1	+	.5884***	.00054	L1	+	0.3121***	.000660
PROF	_	-.00203	.00296	PROF	_	.0346***	.00146	PROF	_	-0.034***	.001267
ASTANG	+	.28948***	.00140	ASTANG	+	.1835***	.00104	ASTANG	+	0.0801***	.000231
SIZE	+	-.01706***	.00015	SIZE	+	-.0106***	.00010	SIZE	_	-0.0168***	.000099
GROWTH	+	.00669***	.00126	GROWTH	+	.0012***	.00010	GROWTH	+	0.0067***	.000648
AGE	+	.00102***	.00001	AGE	+	.0006***	.00001	AGE	+	0.0010***	.000002
RISK	_	.00079***	.00001	RISK	_	.0003***	.00002	RISK	+	0.0010***	.000005
LIQUID		.00548***	.00010	LIQUID	_	-.0012***	.00009	LIQUID	_	0.0066***	.000075
ADJUSTMENT SPEED (%) = 50% AR 1= 0.0018 SARGAN = 0.7915 AR2 = 0.7757 WALD = (494000)***				AR 1= 0.0778 AR2 = 0.5141		SARGAN 0.8355 WALD = (8310000) ***		AR 1= 0.0045 AR2 = 0.9197		SARGAN = 0.7672 WALD = (7300000)***	

TOTLEV= Total leverage**,** measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability**.** *** shows highest level of significant at 0.01, while ** and * shows significance at 5% 0.10 respectively. **ADJUST SPEED** is the speed of adjustment and is achieved by subtracting the coefficient of lagged total debt (L1) from 1. In GMM, first level autocorrelation is normal. The validity of instruments is confirmed when the P value of the Sargan test is greater than .05.

Appendix: 5.6: Capital Structure Determinants and SOA of Small Firms

TOTLEV	Exp. Sign	Coefficient	Std. Error	LTLEV	Exp. Sign	Coefficient	Std. Error	STLEV	Exp. Sign	Coefficient	Std. Error
_Cons	+	.11313***	.001507	_Cons	+	.10818***	.00054	_Cons	+	.092923***	.00014
L1	+	.41968***	.000379	L1	+	.30699***	.00089	L1	+	.261941***	.00011
PROF	_	-.00579***	.001590	PROF	_	.00042	.00093	PROF	_	-.024737***	.00049
ASTANG	+	.54101***	.002390	ASTANG	+	.36315***	.00174	ASTANG	+	.161043***	.00026
SIZE	+	-.00142***	.000222	SIZE	+	.00323***	.00008	SIZE	_	-.012401***	.00002
GROWTH	+	.07809***	.001597	GROWTH	+	.02165***	.00054	GROWTH	+	.056852***	.00037
AGE	+	-.00009***	.000006	AGE	+	-.00093***	.00002	AGE	+	.000081***	.00000
RISK	_	.00027***	.000014	RISK	_	.00059***	.00002	RISK	+	-.000192***	.00000
LIQUID		.00126***	.000079	LIQUID	_	.00478***	.00009	LIQUID	_	.001484***	.00002
ADJUSTMENT SPEED (%) = 58% AR 1= 0.0006 SARGAN = 0.9985 AR2 = 0.8865 WALD = (1410000)***				AR 1= 0.0012 AR2 = 0.7075		SARGAN 0.9846 WALD = (5140000) ***		AR 1= 0.0008 AR2 = 0.9087		SARGAN = 0.9830 WALD = (840000)***	

TOTLEV= Total leverage**,** measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability**.** *** shows highest level of significant at 0.01, while ** and * shows significance at 5% 0.10 respectively. **ADJUST SPEED** is the speed of adjustment and is achieved by subtracting the coefficient of lagged total debt (L1) from 1. In GMM, first level autocorrelation is normal. The validity of instruments is confirmed when the P value of the Sargan test is greater than .05.

Appendix: 5.7: Industrial Sectors and Subsectors Based on NSE Classification		
1)	**AGRICULTURE**	Fishing, Hunting, Trapping Crop production, Livestock, Animal specialties
2)	**CONGLOMERATES**	Large firms that incorporate engineering to produce varied products.
3)	**CONSTRUCTION/ REAL ESTATE**	Construction, Non-Building, Heavy Construction Property Management, Real Estate Development, Real Estate Building Structure completion, Site Preparation Services, Other Construction Services
4)	**CONSUMER GOODS**	Automobiles, Auto Parts, Beverages, Brewers, Distillers, Beverages(Non-Alcoholic), Consumer Electronics, Food Products, Household Durables, Personal Household Products, Textiles, Tobacco Products, Toys and Games
5)	**HEALTHCARE**	Healthcare Providers, Medical Equipment, Medical Supplies, Pharmaceuticals
6)	**INFORMATION AND COMMUNICATION TECHNOLOGY**	Computers and Peripherals, Computer Based Systems, Computer Software, Diversified Communication Services, Electronic Office Equipment, Internet Service Providers, IT Services, Processing Systems Scientific and Technical Instrument, Semiconductors, Telecommunications Carriers, Telecommunications Equipment Telecommunication services
7)	**INDUSTRIAL GOODS**	Building Materials, Electronic and Electrical Products, Packaging, Containers, Tools and Machinery
8)	**NATURAL RESOURCES**	Chemicals, Metals, Precious Metals, Precious Stones, Paper and Forest Products, Non-Metallic Mineral Mining
9)	**OIL AND GAS**	Coal Extraction, Coal and Coal Products Distributors, Crude Oil and Natural Gas Extraction, Petroleum Refining Petroleum and Petroleum Products Distributors, Petroleum Bulk Stations and Terminals, Gasoline Stations Energy Equipment and Services, Field Services, Integrated Oil and Gas Services
10)	**SERVICES**	Advertising Agencies, Employment Solutions, Printing, Publishing, Waste Management, Airlines, Courier, Freight, Delivery, Rail Transportation, Road Transportation, Water Transportation, Storage/Warehousing Transport-Related Services, Hospitality, Hotel, Lodging, Education, Training, Media, Entertainment, Repair, Maintenance, Travel and Tourism, Miscellaneous Services, Apparel Retailers, Automobile, Auto Part Retailers

Appendix: 5.8: Mean and Median Leverage Across Industries

INDUSTRY	NSE Code	MEAN LTLEV	MEAN STLEV	MEDIAN LTLEV	MEDIAN STLEV
AGRICULTURE	01	0.15	0.06	0.14	0.05
CONGLOMERATES	02	0.16	0.07	0.16	0.08
CONSTRUCTION REAL ESTATES	03	0.15	0.07	0.14	0.07
CONSUMER GOODS	04	0.19	0.08	0.18	0.06
HEALTH CARE	05	0.21	0.08	0.20	0.06
COMPUTER AND INFORMATION	06	0.21	0.07	0.20	0.04
INDUSTRIAL GOODS	07	0.20	0.03	0.18	0.04
NATURAL RESOURCES	08	0.12	0.04	0.10	0.02
OIL AND GAS	09	0.11	0.03	0.10	0.01
SERVICES	10	0.12	0.03	0.12	0.01

Note: **LTLEV** = Long-term leverage and is measured as long-term debt over total assets; **STLEV** = Short-term leverage and is measured as short-term debt over total assets. **Nigerian Stock Exchange (NSE)** classified firms into 12 different industries. However, this study excludes financial service and utility firms

Appendix: 5.9a Determinants of Long-term Leverage and SOA Across Industries										
LTLEV	AGRICULTURE		CONGLOMERATE		CONSTRUCTION REAL ESTATES		CONSUMER GOODS		HEALTH CARE	
	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.
_Cons	.1026228	.0798823	.0046234	.0421686	.2461445***	.0371559	.0697963**	.031558	.077870***	.0537065
L1	.4503981***	.0921211	.6036282***	.1392186	.1203785	.1144568	.302027***	.0474014	.374828***	.0585648
PROF	.2536758	.1648633	-.1984041***	.0977651	-.0679235	.0635874	-.43108***	.0685862	.2356721*	.1226758
ASTANG	.1699258**	.0860496	.315825***	.032348	.1188395***	.028586	.144814***	.0156428	.486853***	.0354124
SIZE	-.0007629	.0096544	.0118555***	.0044935	-.0145548***	.003636	.011109***	.0038611	.0085914	.0071222
GROWT	-.2156511	.3924609	.1348605**	.0727328	-.0124646*	.0070512	.0084743	.0183216	-.0329174	.0230963
AGE	-.0000324	.0004734	-.000445	.0003471	.0001566	.0002143	-.000071	.0003745	-.0005949	.0006491
RISK	.0002901	.0011154	-.0018472***	.0006498	-.0001753	.0006174	.0003662	.0006599	.0023932**	.0012158
LIQUID	-.017575*	.0092276	.0011525	.0019176	-.0047301	.0076901	-.0040901	.0043513	-.0022492	.0039429
LTLEV	COMPUTER & INFORMATION TECHNOLOGY		INDUSTRIAL GOODS		NATURAL RESOURCES		OIL AND GAS		SERVICES	
	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.
_Cons	.1679973***	.0344826	.1859137***	.0326403	.3096676***	.0712158	-.00590	.124552	-.004826	.0483645
L1	.5420725***	.0473275	.154789***	.048441	.2729353***	.0462573	.02299	.0413146	.727852***	.0296011
PROF	-.2787154***	.0872161	-.0316016	.0791417	.0650966	.2171913	.35822***	.0566092	.019565	.079275

ASTANG	**.4617426*** **	**.0819582**	**.173943*** **	**.0224167**	**.4494334*** **	**.0286238**	**.20143*** **	**.0200641**	**.336940*** **	**.0247734**
SIZE	**-.0144895*** **	**.004644**	**-.0040243**	**.004321**	**-.0336264*** **	**.0098296**	**.0067161**	**.0066966**	**.007149**	**.0083654**
GROWTH	**-.002908**	**.0094112**	**.028192**	**.0438073**	**-.0159374**	**.028508**	**.08341*** **	**.0059216**	**.055804***	**.0304286**
AGE	**.000299**	**.0002083**	**.0001489**	**.0004256**	**-.0009336***	**.0005368**	**.000221**	**.0002117**	**-0.000415**	**.0004232**
RISK	**-.0006804**	**.0007381**	**-.0011488***	**.000624**	**-.0019972***	**.0011059**	**.002900**	**.0004896**	**.000978***	**.0005916**
LIQUID	**.0137029**	**.0090442**	**.0004019**	**.0035726**	**.024912***	**.0134487**	**.00760*** **	**.0027025**	**.0035545**	**.0053603**

TOTLEV= Total leverage, measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability. *** shows highest level of significant at 0.01, while ** and * shows significance at 0.10 respectively.

Appendix: 5.9b: Determinants of Short-term Leverage and SOA Across Industries										
STLEV	AGRICULTURE		CONGLOMERATE		CONSTRUCTION REAL ESTATES		CONSUMER GOODS		HEALTH CARE	
	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.	Coef.	Std Err.
_Cons	.0528888	.0353336	.0133771	.0169002	.115358***	.0443623	.157229***	.0255855	.273988***	.0438293
L1	.1165766	.1035259	.0350477	.0324483	.488969***	.0574825	.185253***	.0509029	.1443855**	.0681192
PROF	-.1119769	.0810815	-.0980337**	.0492188	.0283465	.0804359	-.0335566	.0590974	.1891017*	.1047722
ASTANG	.2106263***	.0450014	-.0014188	.0135411	-.0597297	0377832	.082043***	.0131156	.0386691	.0292067
SIZE	-.0005437	.0039777	.0117258***	.0023257	-.011267**	.0046000	-.0120288	.0031379	-.03167***	.0061251
GROWTH	-.3951696**	.1829786	.5923815***	.0335092	-.0160552*	.0091304	-.0099700	.0156404	-.0101443	.0208116
AGE	-.0003557	.0002734	-.0002503	.0001599	-.0000399	.0003545	-.0000403	.0003252	-.0005094	.0005352
RISK	.0028302***	.0005825	-.0001579	.0003091	.002649***	.0007259	-.0002225	.0005742	.0000754	.0009387
LIQUID	.0057615	.0053889	-.007176 ***	.0012973	-.0042774	.0103776	-.0031725	.0043055	.009624***	.0031742
STLEV	COMPUTER & INFORMATION TECHNOLOGY		INDUSTRIAL GOODS		NATURAL RESOURCES		OIL AND GAS		SERVICES	
	Coef.	Std Err.	Coef.	Std Err.	Coef	Std Err.	Coef.	Std Err.	Coef.	Std Err.
_Cons	.0931066**	.042172	.0235443	.0275015	.247482***	.0826659	0.325741**	.051889	.005980	.0395155
L1	.0905008	.0590448	.3202167***	.0445856	.334524***	.0884424	-0.0819***	.038778	.22609***	.0457903
PROF	-.1278932	.117358	.1235406*	.0645327	.0036149	.2716682	-0.2757***	.0543851	-.09410	.0604861

ASTANG	**.6957682*** **	**.1080596**	**.214234*** **	**.0199365**	**.0846399** **	**.040255**	**0.15708*** **	**.0194259**	**.16408*** **	**.0198705**
SIZE	**-.0092853**	**.0061436**	**.0018911**	**.0037696**	**-.03368*** **	**.0107295**	**0.016260** **	**.0068298**	**.00176**	**.0065704**
GROWTH	**-.0035056**	**.0120473**	**.0187123**	**.0349358**	**.0529599**	**.0326463**	**-0.010036***	**.0058904**	**.03426**	**.0250104**
AGE	**.0009544*** **	**.0002178**	**-.000343**	**.0003152**	**-.0007682**	**.0007346**	**-0.00014**	**.0002238**	**.000221**	**.0003158**
RISK	**.0023146** **	**.0010238**	**-.0009241***	**.0005445**	**-.0013237**	**.0012142**	**0.00164*** **	**.0004336**	**-.00054**	**.0004926**
LIQUID	**-.008628**	**.0107295**	**-.0049462**	**.0033696**	**.0198233**	**.0163412**	**0.00159**	**.0023229**	**-.00109**	**.0045542**

TOTLEV= Total leverage, measured as total debt over total assets. **LTLEV** = Long-term leverage, measured as long-term debt over total assets. **STLEV** = Short-term leverage, measured as short-term debt over total assets. **L1**= Lagged Value of the dependent variable. **PROF** = Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG** = Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE** = Firm size, measured as natural log of sales. **GROWTH** = Firm growth, measured as percentage change in revenues. **AGE** = Firm Age, measured as the number of years in the business. **RISK** = Business risk and is measured as the standard deviation of return on assets. **LIQUID** = Liquidity and is measured as the ratio of current asset to current liability. *** shows highest level of significant at 0.01, while ** and * shows significance at 0.10 respectively

Table 6.3 Comparing the Adjustment Speed Across Different Industry

	AGRICULTURE			CONGLOMERATE			CONSTRUCTION REAL ESTATES			CONSUMER GOODS		
	TOTLEV	LTLEV	STLEV	TOTLEV	LTLEV	STLEV	TOTLEV	LTLEV	STLEV	TOTLEV	LTLEV	STLEV
L1	.4194***	.4339***	.0895	.3282***	.4780***	-.0046	.3576	.0732	0.4970	.4901***	.3020***	.1853***
PROF	.1827	.1667	-.1018	-.614***	-.3157***	-.1615***	-.0292	-.0418	0.0008	.0975***	-.431***	-.0336
ASTNG	.3180***	.1945**	.1899***	.4620***	.3755***	.0317**	.0915*	.1194***	-0.0615	.0217***	.1448***	.0820***
SIZE	-.0077	.0114***	-.0021	.0458***	.0217***	.0165***	-.0274***	-.016***	-0.0105	.0052	.0111***	-.0120
GROWTH	-.8622**	-.1338	-.4588**	.6981***	.1218*	.5759***	-.0284**	-.0114	-0.0170	.0254	.00847	-.0099
AGE	-.0014	-.0001	-.0008**	.0006	.0002	.0005**	-.0002	.0003	-0.0002	.0005	-.0001	-.0000
RISK	.0035**	.0013	.0032***	-.002***	-.0018***	-.0002	.0021**	-.0003	0.0028	.0009	.00037	-.0002
LIQUID	-.0190*	-.0140	.0006	-.0001	-.0011	-.0037***	-.0128	-.0036	-0.0056	.0064**	-.0041	-.0032
	HEALTH CARE			COMPUTER & IT			INDUSTRIAL GOODS			NATURAL RESOURCES		
	TOTLEV	LTLEV	STLEV	TOTLEV	LTLEV	STLEV	TOTLEV	LTLEV	STLEV	TOTLEV	LTLEV	STLEV
L1	.4446***	.3748***	.1444**	.2570***	.5421***	.0905	.2390***	.1548***	.3202***	.2766***	.2729***	.3345***
PROF	.4726***	.2357*	.1891*	-.4443***	-.2787***	-.1279	.0963	-.0316	.1235*	.1431	.0651	.0036
ASTNG	.5406***	.4869***	.0387	.2497***	.4617***	.6958***	.3886***	.1739***	.2142***	.5720***	.4494***	.0846**
SIZE	-.0250**	.0086	-.0317***	-.0190**	-.0145***	-.00929	-.0007	-.0040	.0019	-.0657***	-.034***	-.0336***

GRWT	**-.0297**	**-.0329**	**-.0101**	**-.0043**	**-.0029**	**-.0035**	**-.0020**	**.0282**	**.0187**	**.0281**	**-.0159**	**.0529**
AGE	**-.0012**	**-.0006**	**-.0005**	**.0010*** **	**.0003**	**.0009*** **	**.0002**	**.0001**	**-.0003**	**-.0020****	**-.0009***	**-.0008**
RISK	**.0012**	**.0024****	**.0007**	**.0009**	**.5421*** **	**.0023****	**-.0017***	**.1548*** **	**-.0009***	**-.0019**	**.2729*** **	**-.0013**
LIQUID	**.0072**	**-.0022**	**.0096*** **	**.0110**	**-.2787*** **	**-.0086**	**-.0081**	**-.0316**	**-.0049**	**.0279**	**.06509**	**.0198**

	OIL AND GAS			**SERVICES**		
	TOTLEV	**LTLEV**	**STLEV**	**TOTLEV**	**LTLEV**	**STLEV**
L1	**.1656****	**.0229**	**-.0819*** **	**.5950*** **	**0.7278*** **	**.2260*** **
PROF	**.0832**	**.3582*** *	**-.2757*** **	**.0010**	**0.0196**	**-.0941**
ASTANG	**.4214*** **	**.2014*** *	**.1571*** **	**.5255*** **	**0.3369*** **	**.1641*** **
SIZE	**.0184***	**0.0067**	**.0163****	**.0100**	**0.0071**	**.0018**
GRWT	**.0554*** **	**0.0834*** **	**-.0100***	**.0493**	**0.0558***	**.0343**
AGE	**-.0002**	**0.0002**	**-.0001**	**.0002**	**-0.0004**	**.0002**
RISK	**.0045*** **	**0.0229**	**.0016*** **	**.0002**	**0.7279*** **	**-.0005**
LIQUID	**.0093****	**0.3582*** **	**0.0016**	**.0015**	**0.01956**	**-.0011**

TOTLEV= Total leverage, measured as total debt over total assets**. LTLEV =** Long-term leverage, measured as long-term debt over total assets. **STLEV =** Short-term leverage, measured as short-term debt over total assets**. L1=** Lagged Value of the dependent variable**. PROF =** Profitability, measured as the ratio of operating profit to the total assets' book Value. **ASTANG =** Asset tangibility, measured as ratio of fixed asset to total asset. **SIZE =** Firm size, measured as natural log of sales. **GROWTH =** Firm growth, measured as percentage change in revenues. **AGE =** Firm Age, measured as the number of years in the business**. RISK =** Operating risk and is measured as the standard deviation of return on assets. **LIQUID =** Liquidity and is measured as the ratio of current asset to current liability. The Results are approximated to 4 decimal places.